GENERAL INFORMATION

The Farm

QUARTERLY, SUMMER 1955, FIFTY CENTS

Liquid Fertilizer
quick, easy, profitable

Low-cost Corn Cribs

Money in Quail

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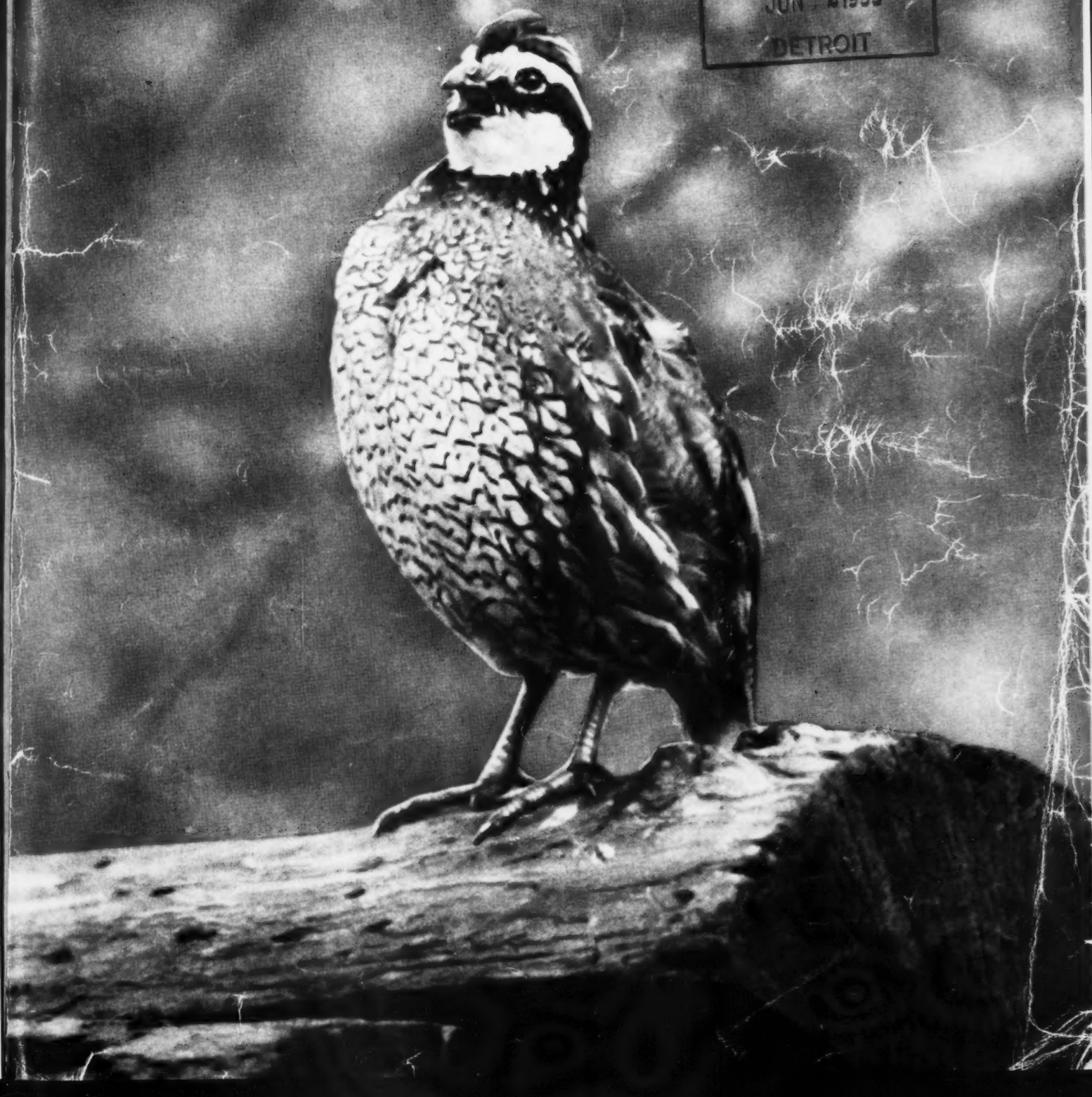
DETROIT



Only Super-Sure-Grips have the greater pull of "WEDGE-IN" ACTION!

Farmers who have worked with Super-Sure-Grips can't be fooled by other tires *resembling* them. They know that ONLY Super-Sure-Grips have all these all-important features:

RULER-STRAIGHT LUGS, coming closer together *at shoulders,* take a "wedge-in" bite that *firms* loose soil — gives "the greatest pull on earth"!

O-P-E-N C-E-N-T-E-R helps *ruler-straight* lugs bite deeper, pull better!

LONG, EVEN WEAR — for *ruler-straight* lugs work evenly against soil, roll smoothly on road — and so wear slowly and evenly!

RE-LUGGING SAVINGS—for its vastly stronger body keeps Super-Sure-Grip *fit* to re-lug or re-tread — and *re-use!*

That's why, despite imitations, *more farmers surveyed prefer Super-Sure-Grips than all other leading makes put together!* So get the real thing — with its real savings in time, work, gas and money — see your helpful Goodyear Dealer! Goodyear, Farm Tire Dept., Akron 16, Ohio.

Super-Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

FIRST in Traction • FIRST in Long Wear *FIRST Choice on the Farm!*

GOODYEAR

Super-Sure-Grip Tractor Tires

THERE'S A SPECIALLY DESIGNED GOODYEAR TIRE FOR EACH VEHICLE ON THE FARM

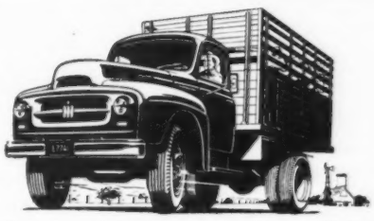
We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

ALL TRUCK

to cut costs on All Farms

There is an INTERNATIONAL pickup for every pickup truck use. Eleven models—all available with automatic transmission, power steering. New ONE HUNDRED, easiest-to-drive in lowest-priced field, also offers tubeless tires, standard—optional overdrive transmission.

All-truck medium-duty INTERNATIONALS with combination stock rack and grain bodies cut costs on a variety of farm jobs. Choice of two high-economy engines. Power steering optional.



For ranchers and other big-acreage operators, INTERNATIONAL four-wheel-drive models provide money-saving stamina. Eight speeds forward, two reverse, permit operation almost anywhere.

Farmers who use INTERNATIONAL trucks rate them high in economy.

The reason is that INTERNATIONALS are built to take rough, rugged going. They are built by *specialists* in mechanized farm equipment. And they are *all-truck, husky and tough,* with no automobile parts or design compromises, anywhere.

INTERNATIONALS give you extra stamina, plus outstanding performance, easy handling, comfort and convenience. If you are in the market for a new farm truck, visit your nearby INTERNATIONAL Dealer or Branch and learn all the reasons why an INTERNATIONAL is your best truck buy.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

International Harvester Builds **McCORMICK**® Farm Equipment and **FARMALL**® Tractors...Motor Trucks...Industrial Power...Refrigerators and Freezers

Watch "The Halls of Ivy," with Ronald Colman and Benita Hume, CBS-TV, Tuesdays, 8:30 p.m., EST

INTERNATIONAL® TRUCKS

"Standard of the Highway"

Get MORE for your money with SHUR-RANE®

PORTABLE SPRINKLER IRRIGATION

engineered to your needs!

THESE BOOKLETS TELL HOW!

GET THESE FACTS:

HOW SHUR-RANE boosts corn over 50%...

SHUR-RANE in FORAGE

SHUR-RANE in GRAPES

SHUR-ROLL for pasture irrigation

FACTS that

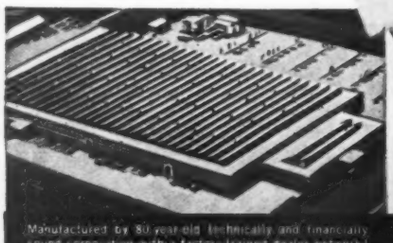
CUTTING IRRIGATION COSTS

BUY NOW... PAY LATER!

LOW DOWN PAYMENT
LONG PAYMENT PERIOD
MODERATE INTEREST RATES
ONLY AT SHUR-RANE DEALERS

Write for name of your nearest Shur-Rane Dealer. He can give you full particulars of this first nationwide time payment plan.

...RANE engineers make one acre work for two by analyzing crops, soil, terrain, weather, water and labor supply . . . even in so-called wet climates SHUR-RANE will bring bigger, guaranteed returns on your farm investment!



Manufactured by 80-year-old technically and financially sound corporation with a factory-trained dealer network!

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Name _____

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If in one of 14 Southeastern states, send to Florida Div., Lakeland, Fla.

fmc TRADE MARK

SHUR-RANE IRRIGATION SYSTEMS, Dept. FQ-51
Food Machinery & Chemical Corp., Box 145, San Jose 1, California

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Now. . . a Low-Built 2 PLOW Tractor That Cultivates 2 ROWS . . . Up Front

The JOHN DEERE "40" TWO-ROW UTILITY

YOU are invited to treat yourself to an entirely new experience. Get up on the seat and drive the new low-built John Deere "40" Utility Tractor equipped with Quik-Tatch *front-end* two-row cultivator. You'll quickly see why we say, "You haven't seen anything in ease of handling and effortless view of the work until you have handled this latest "40."

Complete Power—Helper Power

It's a full two-plow tractor—*tailor-made* for you if you farm up to 100 acres, or if you are looking for a "helper" for a larger tractor.

The name "Utility" is descriptive; it tells you that here's a time-, muscle-, and money-saver on a wide variety of farm work. Engine is the famous John Deere-built "40" that's setting new records everywhere for low-cost operation and maintenance. Hydraulic system is the time-proved "live" Dual Touch-o-matic with Load-and-Depth Control, the mechanical muscle that puts hustle in all your farming jobs.

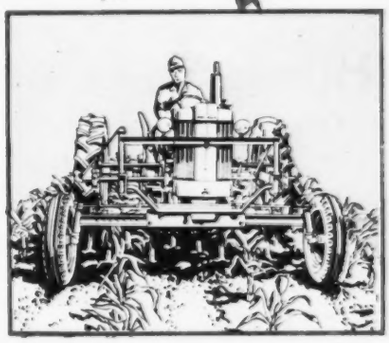
Easy Handling—Full Adaptability

Easy-acting clutch assures smooth take-offs; shock-resistant steering means easier handling in all conditions. Wheel treads adjust as wide as 80 inches for straddling two rows and can be set in as narrow as 48 inches. Remote hydraulic system is available for drawn tools.

Quik-Tatch Equipment

Standard 3-point hitch (regular equipment) gives you "pick up and go" convenience with any of the big line of John Deere Quik-Tatch tools, and with many tools of other makes that you may already own. Roomy platform, adjustable deep-cushion seat, and simple controls offer true comfort and convenience for the operator, sitting or standing.

Now is a good time to talk with your John Deere dealer and arrange for that free demonstration. He will be happy to prove the extra value of the "40."



Wheels adjust as wide as 80 inches to straddle two rows of corn, cotton, peanuts, beans, and similar crops. You cultivate 25 to 35 acres per day!

JOHN DEERE
MOLINE, ILLINOIS

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☐ "40" Tricycle ☐ "40" Standard
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Name_____

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CHOOSE the "40" That Fits Your Needs Exactly

TRICYCLE STANDARD UTILITY HI-CROP CRAWLER

Sign of better health for your livestock

Hundreds of new signs like this are going up across the country

A new sign . . . a new graduate veterinarian begins his professional practice.

It's a great day for him . . . and for you, too, because he's a specialist you can rely on to help protect the health of your livestock — and your investment.

If there is a new veterinarian in your community—bid him welcome. He's one of hundreds* of new graduates who are joining 19,176 older veterinarians in playing a vital role in America's livestock industry.

Young or old—your veterinarian is a man of high professional standards . . . a man who subscribes to this creed . . .

"To regard my profession as something more than a means of livelihood . . . To guide my conduct by sober judgment . . . To be modest, and open-minded and thankful for every opportunity to increase my knowledge and my usefulness . . ."

Backed by vast veterinary research . . . by years of intensive scientific study . . . your veterinarian brings to your farm high professional skill for diagnosis, specialized treatment, surgery, and counsel on preventive practices including nutrition.

Vital allies of your veterinarian in conquering disease are effective, reliable drugs. Squibb serves the veterinary profession and you by providing drugs of highest efficacy . . . veterinary products based on sound, authoritative research.

Your veterinarian, plus dependable drugs, and good management practices—*all working together*—help keep your herds healthy, productive, and more profitable.

Have you ever thought of your Veterinarian as a Health Engineer? More and more farmers are proving that Health Engineering is their most economical way to keep livestock healthy and producing at a profit.

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For prompt, accurate diagnosis, always consult your veterinarian.

*More than half of the estimated 901 new graduates will enter general practice. Others will begin important work in specialized practice, armed forces, teaching, research, regulatory or commercial services.

SQUIBB —A NAME YOU CAN TRUST

They're **New** —they're **Tricycles** —and they're **FORDS**

NEW! Power Adjusted Rear Wheels

NEW! High Crop Clearance, with Safety

NEW! Tailored Traction with exclusive Vari-Weight System

Both 2- and 4-Row Planting and Cultivating Equipment

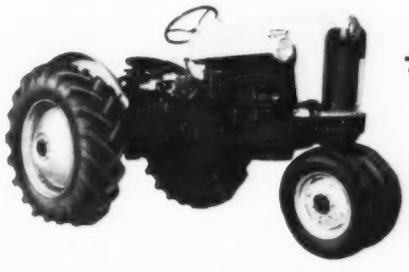
You have perhaps wondered what would happen if Ford engineering skill and long experience went all out to build really new, really better tricycle tractors. Now you can find out!

Here, for the first time, are tricycle tractors built by Ford... in two power series. Both fitted for 4-row and 2-row front-mounted cultivators and planters and for 1-row and 2-row mounted corn pickers and harvesters. One series with full 3-plow power, the other with full 2-plow power.

A new combination of *high* crop clearance and *low* driver seat makes these tractors the safest as well as the *easiest handling* tricycles you ever saw. There's an ingenious Vari-Weight System of wheel and front-end weights available to give you true "Tailored Traction."

Enough other great features to fill a book! And this book is waiting for you at your nearby Ford Tractor and Implement Dealer's. Drop in, ask for it and have a good look at Ford's new Tricycle Tractors soon.

TRACTOR AND IMPLEMENT DIVISION
FORD MOTOR COMPANY
Birmingham, Michigan



700 SERIES
Full 2-Plow Power

Ford Farming
GETS MORE DONE...AT LOWER COST

NOW! EASY TERMS ON

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Surge Milker Units	Parlor Stalls
Breaker Cup Units	Stainless Steel Wash Tanks
Vacuum Pumps	The Surge ELECTROBRAIN
Milk Pumps	Automatic Pipe Line Washers
Releasers	RANDELS
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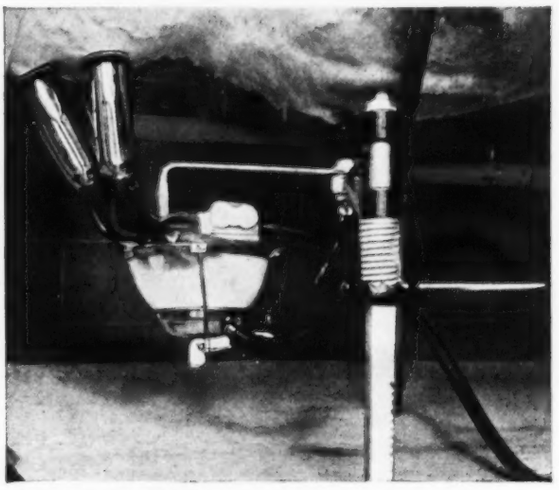
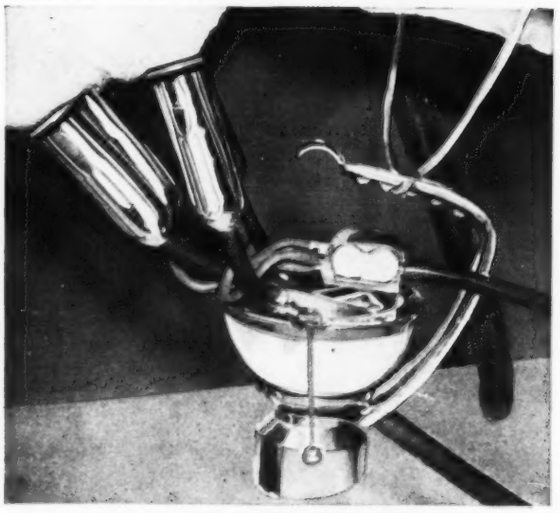
	Sanitary Fittings

. . . all that you need to meet any set of conditions is offered you on terms that you can handle.



★ ***Parlor Milkers***



★ ***Stanchion Pipeline Milkers***

★ ***Bucket Milkers***

Any milking machine that bears the Surge Nameplate milks with Genuine Surge TUG & PULL, which is the best possible guarantee that you will get good cow milking.

Any milking machine that bears the Surge Nameplate is protected by Organized Surge Service, which is the best guarantee there is that you won't be left in a mess.

Any milking machine that bears the Surge Nameplate is now sold on EASY TERMS . . . a down payment that you can swing, and up to twenty-four months to clean up the balance.

It is hard to think of a machine that will save you so much time and labor as a Surge . . . any kind of a Surge.

NOW . . . is a good time to let a Surge start working for you.

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Surge

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ADDA-UNITS

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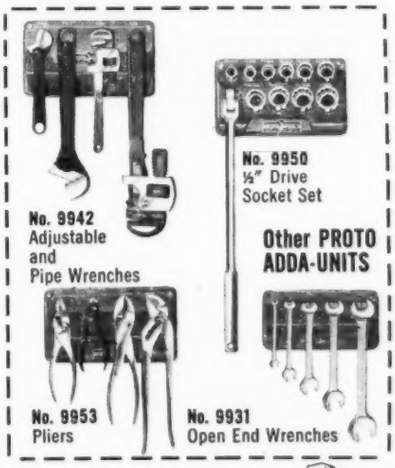
Now, you can buy the PROTO Professional-Quality Tools you always wanted the economical ADDA-UNIT way – as your budget permits. Each unit is a set of highly useful tools in the handiest tool holder ever designed for a workshop. The holders are made of a bright red plastic and are custom molded to hold each tool snugly. They keep your tools where you want them—when you want them—and they add a sparkle of color that makes any workshop a showplace. Start your master PROTO tool set today by getting one or more ADDA-UNITS from your PROTO dealer. Send 10¢ for 68-page catalog of entire line to

PLOMB TOOL COMPANY
2266E Sante Fe Ave., Los Angeles 54, Calif.



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PROTO PRO TO

Eastern Factory, Jamestown, N.Y. • Canadian Factory, London, Ont.

The Farm QUARTERLY

Summer, 1955, Volume 10, Number 2

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THE FARM QUARTERLY
22 East Twelfth Street, Cincinnati 10, Ohio

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How to farm Grass for Cash

Poorly made hay is little more than *roughage* — fit only for starvation rations and bedding. But *hay* made with tools that cut, cure, package, and store it — the way feed-value-conscious farmers know how — is a *cash* crop rich in protein and vitamins, and appetizing to livestock.

The New Idea mower is a precision cutting tool honed and tuned to cut clean in thickest stands. Like Grandma's prized Sheffield steel scissors, it is made *by* experts *for* experts . . . smooth slicing and long wearing.

And when cutting is over, the New Idea side-rake and tedder becomes a key tool. More than just a rake, it is carefully designed to turn tender, high-protein leaves into the center of the windrow where they cure away from the searing sun. Thick, juicy, hard-to-cure stems are turned outward for faster curing. Leaves and stems cure evenly, with little shattering. Feed value is saved and stored for top quality, nourishing winter feed.

Try it on your farm

Ask your community New Idea dealer to bring the New Idea mower or side-rake of your choice to your farm for a demonstration—the trailing or semi-mounted mower, the low-wheel or high-wheel side-rake and tedder. *You will be under no obligation* of any sort. Ask him to let you mow or rake that lush, hard-to-cure first cutting to satisfy yourself that there are no finer tools made.

NEW IDEA

FARM EQUIPMENT CO. DIVISION AVCO DISTRIBUTING CORP.

Department 1540, Coldwater, Ohio

For free, illustrated information on New Idea hay tools, please send us your full name and address.

NEW IDEA MOWERS AND SIDE-RAKES are quick on-and-off. Both the semi-mounted mower (shown here) and the full-trailing model cut clean on square turns. Low-wheel and high-wheel rakes are suspension-trussed for rigid strength. Reels yield at both ends. Controls can be handled from tractor seat. Changes from side-rake to tedder at flip of lever.

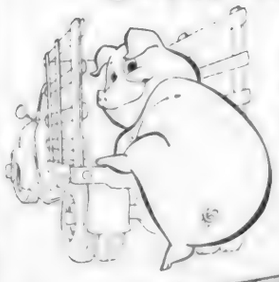
3R's for PORK PROFITS

Start 'em RIGHT with

WAYNE TAIL CURLER! The tasty creep-feed that *tempts* baby pigs onto solid feed *before* sow's milk dwindles. Helps wean pigs extra early. Speeds 'em to a husky 75 lbs. extra-fast. Packed with powerful easily digested nutrients that makes pigs g-r-o-w!

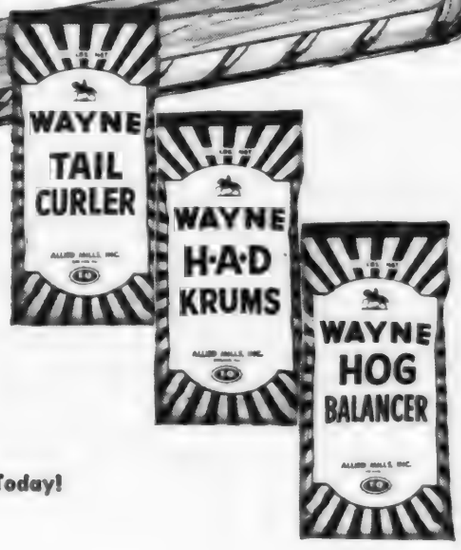
Keep 'em ROBUST with

WAYNE H-A-D KRUMS! *(High Antibiotic Diet)*
Extra rich, extra palatable "booster" ration that keeps 'em eating...to come back fast after disease attack,* castration or vaccination shock or other set-backs. High ANTIBIOTIC LEVEL provides powerful, yet gentle nutrition when it's needed most.
**Such as Infectious Diarrhea (Scours, Necro)*



Grow 'em RUGGED and ready for market—with new, improved WAYNE HOG BALANCER

Fortifies your grains to produce high-speed gains . . . market weights at 5 to 5½ months . . . at low cost per pound of gain. In recent Wayne Research Farm dry-lot tests, 100 lbs. of pork was produced with only 5¼ bu. corn, 49 lbs. Wayne Hog Balancer. Feed from 75 lbs. to market, save on feed costs.



FEED 'EM

WAYNE

ALL THE WAY

BE *WEIGH* AHEAD! See Your Wayne Dealer Today!

ALLIED MILLS, Inc.
Builders of Tomorrow's Feeds . . . Today!
Executive Offices: Chicago 4, Illinois—Service Offices: Fort Wayne 1, Indiana

with the piston rings preferred by more people than any other brand!

Get those *extra* hours of field time (*less* shop time) with Perfect Circle 2-in-1 Chrome piston rings!

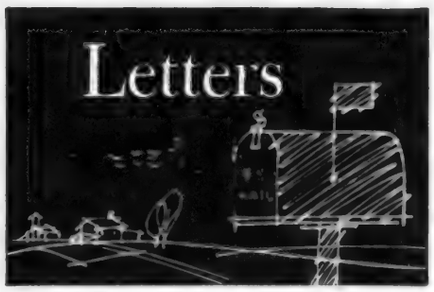
Top performance is assured because:

1. In Perfect Circle's 2-in-1 Chrome set, *both* top ring *and* oil ring are plated with thick, solid chrome!
2. *Entire* area of ring travel gets *complete* wear protection assuring more than double the life of cylinders, pistons and rings.
3. No tedious break-in...rings are lapped-in at factory!

Insist on Perfect Circle 2-in-1 Chrome piston rings for your car, truck or tractor...for sustained power and *positive* oil control! Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Ontario.

Perfect Circle 2-in-1 Chrome piston rings

The Standard of Comparison



Sprinklers Pay Off

Sirs:

We were pleased to find in the Spring issue a picture of our corn irrigation system in the lower right hand corner of page 58. We thought you might be interested in the results of this field.

This was our third season of irrigating. The land is Plainfield Sand that before irrigation and heavy fertilization yielded an average of 30 bushels per acre. This year the 24-acre field yielded an average of 122 bushels. In spite of the better than average rainfall of last season, and with identical fertilizer treatment, all of our corn produced in direct proportion to the efficiency of our irrigation effort. Our yields ran from 90 plus to 150 bushels. In our experience we have seen corn cut over 50 bushels per acre during one hot dry spell where we did not get over it with our sprinklers. This occurred in six days in the last week of August, 1953. During that period, one inch of water, costing us about $1.25 per acre would have been worth over $75. It is therefore easy to see why we are enthusiastic about irrigation.

E. Turner Biddle
Leiters Ford, Indiana

Sorry We Moved the Mill

Sirs:

We have just read the story on "Corn Bread" in the Spring issue of the FARM QUARTERLY by Eleanor Cullen.

It is really too bad that your illustration of Mabry Mill along the Blue Ridge Parkway in southern Virginia should be shown as located in the Great Smoky Mountains National Park.

This is probably the most famous water mill in the entire country and thousands of readers will probably notice this error.

W. Ray Scott
Director of Photography and
and Public Relations
National Park Concessions, Inc.
Mammoth Cave, Kentucky

Dear Sir, You Cur

Sirs:

In reference to your article, "The Farmer Takes a Wife," . . . I get up at 4:30 a. m., milk 15 to 18 cows, feed 38 head, lift 3,000 bales of hay each year, feed 30 bushels of silage a day during the winter. I'll put my strength and vitality against any broad-beam wife.

M. Elizabeth Scott
Upper Mountain Road, Lewiston, N. Y.

Sirs:

Is marriage like buying a critter,
Or harvesting grain in the fall?
Is the wife you take to be valued
By the way she can lift or haul?

W. E. Dobson
Route 4, Lansing, Michigan

Sirs:

Your advice to our farm boys to seek physical fitness, ability to work and rear strong sons is insulting. Our young girls . . . will marry for love!

Mrs. Richard Knox
Canton, Minnesota

(*Continued on page* 72)

New CASE Corn Harvester

- Picks and Husks Ears
- Chops or Shreds Stalks
- Lowers Ration Costs
- Helps Control Borers
- Saves Shelled Corn
- Cuts Costs and Work in Seedbed Preparation

ONCE Over the Field Gives You TWO Yields

You get two crops . . . ears and forage . . . when you harvest corn this way. It makes practical the new, low-cost method of cattle feeding utilizing corn-stalk silage. You can cut early, at rich stage for silage, and put ears through drier. You can harvest after ears are dry enough to crib and add water for silage. You also can use chopped dry stalks for fodder or for the best of bedding.

The Case Corn Harvester saves shelled kernels, too—usually enough to pay for itself in a few hundred acres. You do cleaner, easier plowing and seedbed preparation . . . get better borer control . . . whether chopped stalks are removed or blown back on the ground. The same base machine . . . with windrow pick-up, cutter bar or row-crop unit . . . harvests all hay and silage crops.

Today's Low-Cost Combination Picker-Chopper with PTO Drive

See your Case dealer about corn machines. Ask about the Case Income Payment Plan that fits your farming system. For pictorial folders, check here or write in margin any kind of machine, any size tractor that interests you. J. I. Case Co., Dept. F-905, Racine, Wis.

New Corn Harvester	Portable Crop Elevators
1-row Corn Picker	Wide-tread Farm Trucks
2-row Picker-Sheller	Forage Blower

Acres you farm_____ Student?_____

Name_____

Address_____

Owners say: "More Economical, More Powerful, Easier to Handle"

Massey-Harris 3-plow 33 Tractor and P.T.O. Baler. Engine-driven Baler also available.

Take the wheel of a Massey-Harris —

you'll agree it's the greatest tractor you've ever driven

YOUR first impression behind the wheel of a Massey-Harris tells you this is the tractor you've looked for — one that really measures up to your standards. The feel of it alone says power, stamina, reserve — a willingness to take on heavy work, an eagerness to go.

Start the engine and you sense that power immediately — and you're anxious to try it. Drive into the field and you see your plow suck to full depth fast. The pull stays smooth, steady — no lurching, no overloading.

This performance is the smoothness of Balanced Power Design . . . the teamwork, the quick response . . . the power surge when the pull gets heavy, the cut-back as the load loses its fight.

You expect even more from this power-plus tractor — and you get it. Vision, comfort, roominess . . . easy handling that does more of the work for you . . . easy steering that turns, dodges quick . . . hydraulic control powered up and down . . . an exclusive *wrist-action* 3-point Hitch-All that makes hook-ups easier — anywhere — with a variety of equipment.

You'll find a Massey-Harris works the low-cost way . . . uses fuel according to the load, gets more out of what it does use . . . costs less to maintain and lasts longer because it's built with an extra margin of stamina in every part.

The surest way to prove it to yourself is up on the seat of a Massey-Harris — a field test on your own farm. See your Massey-Harris dealer soon for a demonstration. He has the size tractor you need. Gasoline, diesel, distillate and liquefied petroleum models.

A new booklet "Out of the Mailbag" tells the whole story of economy, power, ease of handling in the words of Massey-Harris owners. For your free copy write Massey-Harris, Dept. F-222 Racine, Wisconsin.

1-2 plow Pacer

3 plow 33

3-4 plow
44 Special

4-5 plow 55

MAKE IT A **Massey-Harris**

Outstanding for Economy, Power, Ease of Handling

Here's HOW to DOUBLE THE YIELD OF EVERY ACRE

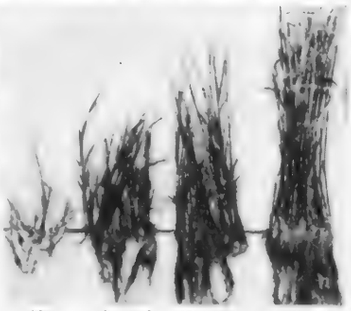
Your Soil Can Be Your Worst Enemy —or Your BEST FRIEND!

10-Fold Increase in Wheat

Without the right fertilizer in the soil, even the best farmer cannot prevent crop failures.

Amazing tests on wheat by a leading ag college show how yield increased ten-fold with proper fertilizer.

Note at right the vigorous root system as well as lush, heavy top growth. The correct fertilizer guided by soil tests produced this bumper crop. Even when soil lacked only phosphate or potash, yield dropped nearly 40%.



No Fertilizer | Lacked Phosphate | Needed Potash | Fertilized Correctly

Outstanding Benefits in Corn

A leading Agriculture Experiment Station made these tests. The first corn plant was grown in a field not properly fertilized. Note the deformed nubbin. Rotted joints and roots (shown by cutting down the center) made the corn lodge. Besides poor yield, the soil was robbed of fertility a bumper crop would have returned.

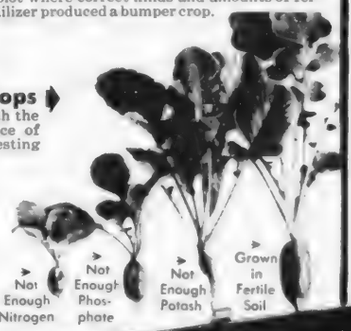
The healthy vigorous root system, sound stalk and perfect ear came from a comparison plot where correct kinds and amounts of fertilizer produced a bumper crop.

Big Gains in Root Crops

The big radish compared with the first three is concrete evidence of cold-cash benefits from soil testing for every kind of crop.

You'll have greater size, earlier harvest and high quality in root crops.

Also lush foliage and vigorous growth of leaf, fruit, vine and grain crops.



Not Enough Nitrogen | Not Enough Phosphate | Not Enough Potash | Grown in Fertile Soil

BETTER CROPS Guarantee

YOU TAKE NO RISK

We are so certain you'll get bigger yield, you can send your Kit back anytime within a year if you don't, and we'll refund your money.

If desired, use our Easy-Payment Plan (see coupon).

Get up to 225 Bu. Corn • 125 Bu. Wheat • 125 Bu. Oats 30 Ton Tomatoes • 5 Tons Hay • 750 Bu. Potatoes Increase Milk Production as much as 300%

There's still time to make sure you'll get bigger and better crops this year. It's not too late—test your soil now and find out what fertilizer each field must have to produce a bumper crop. The Sudbury Soil Test Kit tells what to do!

Soil specialists say side dressing in summer gives many crops a big boost over using fertilizer only in the spring. Soil Tests guarantee you more bushels or tons, and cut your costs. You can turn poor fields into top producers—make good fields break all records. Doubling the yield means 6 times as much profit!

Make More Money This Year

These Easy and Amazing Tests Mean Bigger Crops Right Now!

No matter how much money there is in the bank every farmer wants to see each $1 he puts into his farm bring back as many as it can. No one can afford to invest money in fertilizer and not be sure it's what his crops need. **Stop guessing**—you can make sure every dollar spent pays back up to $10 or more in extra yield. You'll also save money on fertilizer—up to $15 an acre every season—more than enough to pay the taxes on your farm!

Building up your soil is like putting money in the bank—you'll get it back with interest for years to come. You'll also increase the value of your farm instead of wearing it out! It can be done only with Soil Testing. The use of Soil Test Kits is approved by the Dept. of Agriculture.

No Knowledge of Chemistry Needed

EASY AS READING A THERMOMETER

So simple, anyone can use it. Even your first tests will be accurate and reliable. Ready to use anytime, anywhere, even out in the field. Takes only 10 minutes, costs less than 10c a test. No samples to mail, no waiting for reports.

Farmers deLuxe Soil Test Kit

This is the famous Farmers deLuxe Kit, complete with everything for hundreds of tests. More valuable than all your stock and tools! Shows right amount of nitrogen, phosphate and potash for each field. Also whether lime is needed (pH) and how much. Lifetime welded steel chest with carrying handle—stands heavy field work. Weighs only 12½ lbs. Easy instructions show needs of 225 different crops. **Big Value, only $29.95.**

SEND NO MONEY

We'll mail C.O.D. plus postage. Or send check and we'll pay postage, saving you from $1.91 to $3.55 in postal charges.

Money-Back Guarantee

FREE TRIAL

If you are not completely satisfied with your Soil Test Kit, return it in 10 days and **get your money back!**

FREE BOOK

If you send check, we'll also include the valuable 64-page book on farm management, "Our Land and Its Care" **FREE!**

Order Right Away!

425,000 Users Can't Be Wrong!

S.G.H. of Michigan "guessed" his potato field had enough potash but needed nitrogen. Tests showed he was wrong. He saved the nitrogen, bought potash and doubled his yield.

G.H. of Ohio "Have made many tests; like its simplicity and accuracy. Worth 1000 times its cost on my 320 acres; found them low in phosphate."

A.D. of Indiana nearly doubled his corn yields as a result of testing his soil. He also gets 30% more wheat and soybeans per acre.

W.L.D. of Pennsylvania saved $400 on fertilizer. "The Kit has paid for itself over and over again." That's real satisfaction!

R.S.G. of Indiana tested his soil and discovered potash was badly needed. He has increased his corn yield 20%! He also reduced fertilizer costs by using only what his Sudbury Soil Tests showed was needed.

A.F.B. of Iowa increased his bean yield 50% by correcting phosphate and potash deficiencies his Sudbury Soil Test Kit revealed.

Hardware, Seed, Grain and Farm Supply Stores: Serve Your Customers by Carrying this Essential Aid to Better Farming.

SUDBURY Soil Test Kits

SUDBURY LABORATORY, Box 934, South Sudbury, Mass.

World's Largest Makers of Soil Testing Equipment

SUDBURY LABORATORY, Box 934, South Sudbury, Mass.

Send me the Farmers deLuxe Sudbury Soil Test Kit at the special low price marked below:

☐ Enclosed is $29.95; send postpaid; include free book, "Our Land and Its Care."

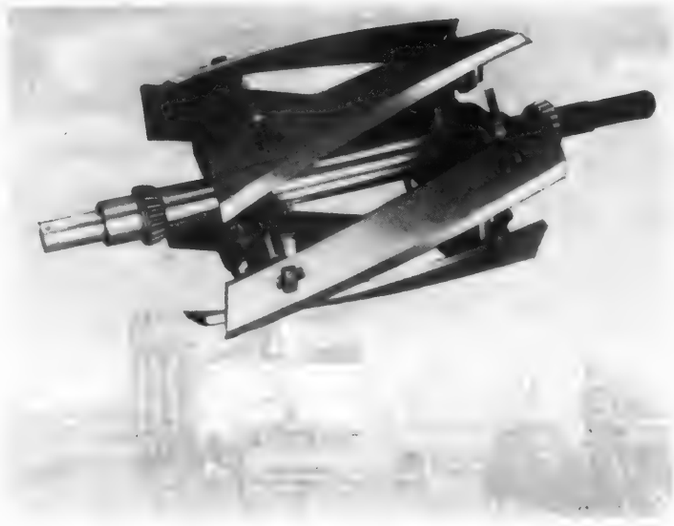
☐ Send C.O.D. plus postage.

Name.....

R.D. or St......

P.O...... *Zone*.... *State*.....

☐ Send on Easy-Payment Plan—I'll pay mailman $4.95 plus postage, then 4 monthly payments of $6.75 each.



This safe, sharp-shearing cutting unit gives the FOX amazing harvesting power

Thousands of field comparisons on grass, corn and sorghum crops have proved —beyond the shadow of a doubt—the genuine worth of the cylinder-type cutting mechanism on the Fox Forage Harvester.

- This easy-running mechanism concentrates its *entire* action on a single important job—that of cutting forage—and does that job with a *sharp shearing action*, rather than blunt, power-wasting chopping.

This power-saving, concentrated cutting action alone would be reason enough to buy a Fox Forage Harvester. But there are many others . . .

The Fox is safest of all forage harvesters. Power for its concentrated, sharp-shearing action is transmitted to the knives through "break-pin" flanges held together by mild steel machine bolts. Should stones— or other hard objects—enter the knives, these bolts shear instantly. The tough ductile bar steel knives —firmly anchored at *both* ends—stop instantly. And there is no damage to the machine and no chance of injury to the operator. Damage, *if any*, is usually confined to the knives, and they can usually be repaired.

The Fox is a long-lived forage harvester— its span of useful years is lengthened by its rigid, non-flexing frame. No matter how rough or uneven the ground, the cutting assembly cannot twist, weave or rack. Knives and cutting bars remain in perfect alignment and adjustment.

Sharpening and adjusting knives is easy to do. First—they are easy to get at. The blower unit is hinged to swing out—and there they are—no reaching or straining. Just 3 simple set screw adjustments at each end of the cutting bar,—on the outside of the housing where they are easy to get at—permit such accurate adjustment of the bar to the knives that they will cleanly shear a single sheet of paper.

Sharpening in the field is even easier. The Fox sharpener can be mounted in less than a minute. Operation for 2 or 3 minutes restores the keen cutting edge of the knives—so you can run them much longer than usual before grinding.

Your Fox Dealer has a booklet detailing more than 20 reasons for the Fox amazing harvesting power—reasons why forage harvesting with a Fox is faster, easier, less tiresome and less expensive than with any other forage harvester. Ask him to give you a copy. Better yet, ask him to show you, item by item, all 20 reasons.

Here's a real challenge. LOOK AT FOX FIRST BEFORE YOU BUY ANY FORAGE HARVESTER. Then compare any other machine with the Fox. We'll gladly rely on your judgment which machine will give you most forage harvesting satisfaction for your hard-earned dollars.

FOX RIVER TRACTOR CO.

The Pioneer of Modern Forage Harvesting

565 N. Rankin St.

APPLETON, WISCONSIN

GET THIS FREE BOOKLET, "NEW WAYS TO MAKE MORE PROFIT FROM FORAGE." An information-packed, profusely illustrated, how-to-do-it booklet. Filled with practical experiences of men who have found a way to make the meat-making, milk producing nutrients nature puts into grass, corn and sorghum crops pay them greater profits.

FOX RIVER TRACTOR CO., 565 N. Rankin, Appleton, Wisconsin

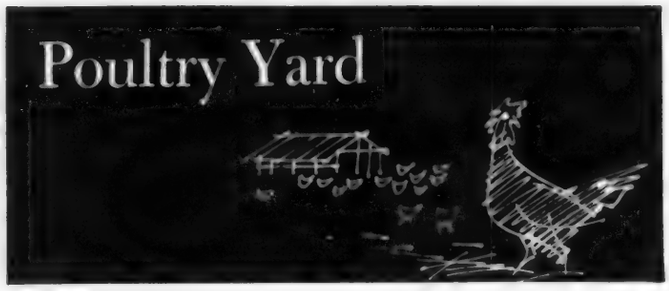
I want to make more profits from my forage crops. Send me your new book on Forage Harvesting ☐ Also send detailed information on the New Fox Forage Harvester ☐

Name_____

Address_____

Town_____ State_____

My Dealer's Name is_____



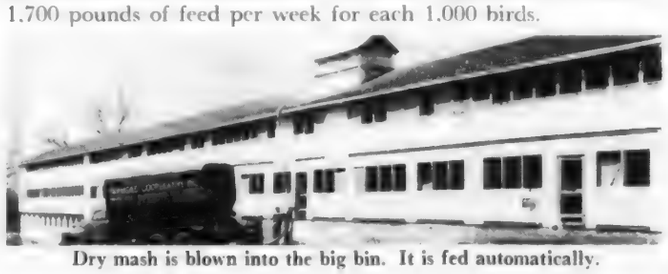
New Bird Eats Less It was bound to happen. The minute we've taken the labor out of chicken feeding, someone produces a chicken that doesn't eat. We haven't quite reached that point yet, but from Britain comes the word that Cyril Thornber, a Yorkshire hatcheryman, working in close cooperation with Henry B. Wallace, of Des Moines, Iowa, has developed a chicken that does well on 40 per cent less feed. Each of the collaborators on this fabulous hen have crossed the Atlantic several times to discuss genetic problems, strains of birds, and the feeds used in poultry raising. The result is a smaller type laying hen with the rather prosaic name, 101.

Bulk Bins Cut Labor After looking over their expense sheets, most poultrymen would agree that feed flows like water—but in New Jersey, feed is actually handled as though it were a liquid and the farmers are money ahead. The dry mash is brought to the farm in giant, 12 ton tank trucks and blown through long hoses into huge steel storage bins. From here, it flows through the laying houses in the automatic feeders which are run from a time switch. The result of this innovation is that the farmer doesn't touch the feed at all, and one man can care for 10,000 laying hens.

The new handling technique was worked out by the Delaware Valley Cooperative, of Flemington, New Jersey, who supply feed to some 600,000 laying hens in the Hunterdon County area. Oscar Grossman, the Co-op manager, designed the special feed trucks which are used to deliver the mash. The flow is made possible by blowers on the trucks which shoot the mash into the vertical bins with four pounds pressure per square inch. From the bin the mash flows into an automatic feeder which propels it through the feeder troughs which wind through the coops and even climb from one floor to the next in multi-storied houses.

The whole concept of automatic feeding hinges, of course, on the fact that a complete feed can be made into a dry mash. Grossman and his associates ran into a tougher problem, however,when it was discovered that the temperature inside the big metal bins ran as high as 125 degrees on a hot day. Such heat will destroy vitamins A and D in short order and no one wants feed with such important nutrients burned out of it. After extensive testing they found that wax-sealed vitamins A and D, provided for them by Nopco Chemical Company, of Harrison, New Jersey, could be stored in the hot bins for ten-day periods without loss of potency. Samples taken on the day of filling and again ten days later when the bins were ready for refilling showed the same concentration of vitamins.

With this problem solved, the Cooperative was ready to start building bins and putting their tank trucks on the road. Today, they have over 100 bins installed with capacities running from four to ten tons of mash each. A four-ton bin costs $250 and each additional ton capacity adds another $20 to the cost and requires an additional two feet of bin height. The capacity of the bin that will be needed on the farm is figured on the basis of 1,700 pounds of feed per week for each 1,000 birds.



Dry mash is blown into the big bin. It is fed automatically.

PURE-BRED CHAROLAISE CATTLE

This calf is not the exceptional one in a thousand. He is a high quality calf, and we picture him because this is the kind of calf you can buy from us regularly. We have had exceptional ones;—calves that weighed over a thousand pounds at less than 10 months and one beauty weighed 530 pounds at 4 months and 20 days. The pure-bred Charolaise is the largest beef animal in the world —and he gets heavy quicker than any other known breed. When cross-bred with other beef breeds, the bulls impart their dominant enormous weight-for-age characteristics and the resultant beef calves, even from scrub dams of other breeds, reach fantastic weights at an early age.

The beef animal which makes big gains quickly will eventually capture the entire market. The pure-bred Charolaise does this better than any other known breed. Start a pure-bred herd now. There are less than a thousand pure-bred Charolaise in the United States, and if you start a herd now, you will have years and years of demand for your calves. If you already have a beef herd, use a pure-bred Charolaise bull to get bigger and heavier beef faster and while you are profiting from using him on your herd, also build up a pure-bred Charolaise herd by having a few pure-bred Charolaise heifers for him to breed. The extra beef that the bull produces from your present herd will give you back his cost in a very, very short time.

Write for descriptive booklet.

TURKEY RIDGE FARM

Member of the American Charolaise Breeders Association
Member of the American Charbray Breeders Association

JAMES CLANCY, Manager **MORRIS COHON, Owner**

NEAR—PORTLAND, PA.

P.O. Box R.F.D. No. 1 **Bangor, Pa.**

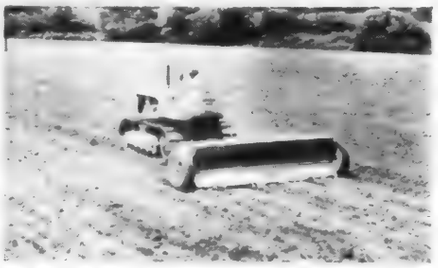
Telephone Portland 104 B-21

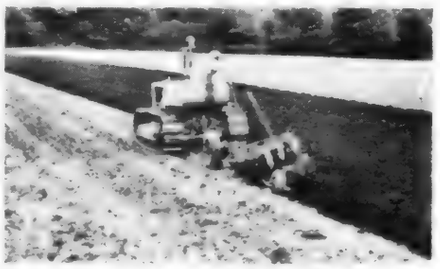
Works where wheel tractors can't . . . this field was too wet for wheel tractors, but when corn prices are right, picking-shelling goes ahead on schedule.

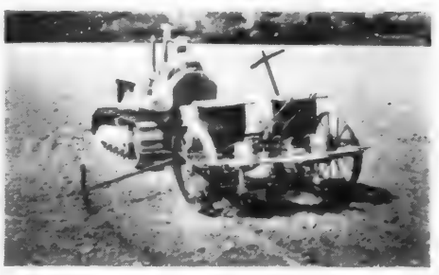
"Why I'm a 5-time Caterpillar Owner!"

"My CAT* D2 Tractor does practically everything on this farm from the lightest to the heaviest job. It is the most economical tractor to operate. We do so many jobs wheel tractors can't. Because of its long life, it has a higher trade-in value, too!"

Rudolph Ludwig, Milford, Penna.







Once a man becomes a Caterpillar owner, ordinary farm tractors often seem like expensive toys by comparison! It's this big difference that makes good, thrifty farmers, like Rudolph Ludwig, buy Caterpillar-built Tractors again and again. Here are a few typical results:

Pulls light loads for less fuel cost than a small gasoline wheel tractor. Burns less than 1 GPH of No. 2 furnace oil on light jobs like this.

Handles heaviest jobs up to 60% faster, at fuel bill savings of 60% to 80%, in comparison to "3-plow" gasoline wheel tractors. No fuel-wasting slippage.

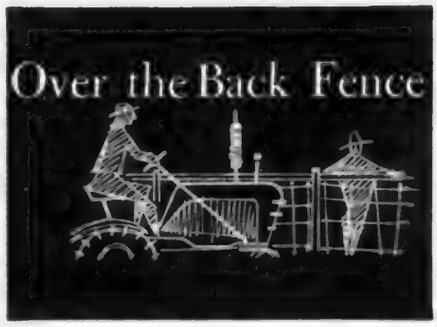
Keeps soil in better condition . . . no ruts left in plowed fields. Packs the soil about ⅔ less than big wheel tractors. Permits plowing to any practical depth.

Can your present farm tractor measure up to this for performance? Have your Caterpillar Dealer show you the one that will! Ask him for your free copy of "Power Farming," or write us, Dept. FQ65, Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks — ®

DIESEL FARM TRACTORS



Myxomatosis — Meat or Poison? What's one man's meat is often another's poison, we always say. Myxomatosis, a disease of rabbits, seems to be just that and we wouldn't be at all surprised if good Queen Elizabeth didn't pin a medal on it at her next birthday. The disease is being hailed in Australia as the savior of a continent. Down there rabbits have been a scourge for many years. They eat more grass each year than the entire sheep population and Australia has spent millions trapping, poisoning, gunning, fencing and suffocating in efforts to control them. Then someone came along with myxomatosis, exposed a few rabbits to it, and turned them loose. Rabbits are dying by the millions and their experts say the sheep industry profited last year to the extent of $100,000,000.

In France, now, the shoe is on the other foot, and it is pinching. France regards her rabbit crop as valuable and rabbits add considerably to the meat supply. In 1952 a misguided professor named Delillie introduced the disease among the rabbits on his estate because they were chewing at his fruit trees. He just wanted to thin them out, he said, but a year later the disease had wiped out one-third the rabbits in France and had spread to England, Germany, Holland and Belgium. Farmers and conservationists yelled bloody murder and instituted a suit against Professor Delillie for several million dollars. The French lawyer who is representing the plaintiffs summed up the case neatly. Said he, "Professor Delillie might as well have used the H-bomb to bring down a couple of partridges."

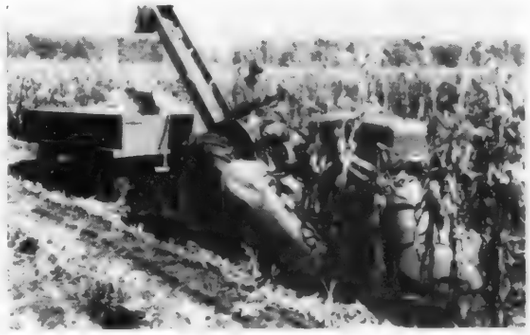
Paint for the Perverted Kid Does your baby bite off the heads of his toy soldiers and swallow them? Does he gnaw at the legs of the grand piano or the slats of his play pen, and do you have to rush him to the hospital periodically to have him pumped out and treated for lead poisoning? If so, take comfort. The Sheffield Bronze Paint Corp., of Cleveland, is marketing a paint which contains no lead and is non-toxic. Baby can safely eat all he wants, and to encourage him the paint comes in four appealing colors: baby blue for boys, baby pink for girls, and kiddie yellow and kiddie pink for mixed crowds of babies. Just spray it on from a push-button container and let him gnaw.

B.F.Goodrich
Power-Grip tractor tires

"I GET MAXIMUM DRAWBAR-PULL OUT OF MY TRACTOR"

Harold Beckes raises hogs and cattle, grows corn, wheat, soy beans and hay on his 500-acre farm near Russelville, Ill. This land includes sand, clay and river bottom areas—tough going for tractors. Beckes reports B. F. Goodrich Power-Grip tractor tires are the best buy for this type of work. He says the wide Power-Grip shoulders and high cleats get maximum drawbar-pull out of his tractor.

B. F. Goodrich Power-Grip cleats are higher and longer, have a bigger face area to press against the soil. The husky, square-cut shoulders penetrate deeper, defy slippage even in muddy soil. The result: you get full traction in forward or reverse from these bigger, more powerful B. F. Goodrich tractor tires.



"Power-Grip tires take hold even in wet ground"—Picking corn after heavy rains could present slippage problems to George Garner on his Leiters Ford, Ind., farm. But he uses B. F. Goodrich Power-Grip tractor tires, reports the bigger tread holds even in wet going. Power-Grip tires look bigger because they *are* bigger. No other tire is wider than Power-Grip. Time after time you'll find that size for size no other tire has more cleats. B. F. Goodrich gives you *more* tire, *more* working power, with big, new Power-Grip tractor tires.

"Super Hi-Cleat open-center tread cleans as it rolls"—Costs 20% less—E. E. Hartman and 6 sons farm 600 acres 8 miles southwest of Findlay, Ohio. About low-cost Super Hi-Cleat tires, he says: "I like the way the open tread keeps earth from packing up on the tire. There is no slippage." Super Hi-Cleat tires sell at *20% less* than first-line makes. Ask your local B. F. Goodrich retailer about them, and about new Power-Grip tires. His address is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Co., Tire & Equipment Div., Akron 18, O.*

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

Here's what Portable Sprinkler Irrigation can do for YOU!

FACTS from a NEW Movie Now Available for YOU to SEE!

INDIANA FARMER USES IRRIGATION TO TRIPLE CORN YIELD IN 1952!
—reports DIX HARPER, WLS, Chicago

"A farmer in east central Indiana started using sprinkler irrigation on corn and pasture several years ago. In 1952 the corn that wasn't irrigated only made 42 bushels to the acre, but he irrigated 16 acres and his harvest was 132 bushels per acre! Michigan State College had a spectacular test on sweet corn. They had 628% more marketable ears per acre with sprinkler irrigation. Irrigation pays in our midwest area where we have normal rainfall."

ALUMINUM BRINGS IRRIGATION COST DOWN ON WEST COAST!
—reports BILL ADAMS, KGO, San Francisco

"We have to have irrigation on the West Coast—for our truck crops, fruit, field crops . . . as a matter of fact, it's being extended now into range land in addition to so-called pasture land. With us, it's not so much a question of *having* irrigation—it's a matter of *cost* of irrigation. And now with aluminum used in sprinkler irrigation the cost has been coming down. Cost not only in labor but in saving water."

SPRINKLER-IRRIGATED SARGO MAKES NORMAL YIELD IN SOUTHWEST DROUTH!
—reports JACK JACKSON, KCMO, Kansas City

"The Southwest was forced into irrigation by one of the severest drouths we ever had, and it is panning out very well. One of the fellows had 22 acres of sargo that made 450 tons of silage—when neighbors around him made practically none at all. One of my friends had some sprinkler-irrigated sudan pasture that carried 54 animal units from the 1st of July to November 5th in 1954. And each fellow I have talked to now feels irrigation will pay off during a normal year, too."

ALUMINUM SPRINKLER IRRIGATION BOOSTS GEORGIA COTTON PRODUCTION 51%!
—reports DICK BOKE, Louisville

"In Georgia a series of studies shows an average of about 51% increase in cotton production if you irrigate as against non-irrigation. In Kentucky in 42 farms we looked over there, the increase in burley production on sprinkler irrigated farms was 560 pounds, with a big improvement in quality. Total annual income from tobacco off those farms has increased by about $350 per acre over non-irrigated farms."

SEE AND HEAR THE FULL STORY! The movie these leading farm reporters made is now available for you to see. Called "Sprinkler Irrigation Roundup", it's chock-full of eye-opening facts like those above—results of irrigation in *all* types of crops . . . in all parts of the country. If your club or organization would like it shown free of charge, contact your farm leader. He can arrange it. Or write for details to the address below

See "Mister Peepers", starring Wally Cox, Sundays on NBC-TV

REYNOLDS ALUMINUM

This label is your guarantee of genuine Reynolds Aluminum Pipe.

This sign identifies dealers who sell Reynolds Aluminum Irrigation Pipe.

Member of SPRINKLER IRRIGATION ASSOCIATION

FREE BOOKLET
"More Income Per Acre" tells how portable sprinkler irrigation can work for *you!* This is the one big opportunity for new income open to every farmer. Send today! Reynolds Metals Company, P.O. Box 1800-SJ, Louisville 1, Kentucky.

A Veterinary Handbook for Swinemen, by J. W. Bailey, The Webb Publishing Co., St. Paul, $5.00.

Here is an excellent book for the hog raiser who wants a reference book on the health problems of his animals. Veterinarians are understandably wary about how-to-do-it books on their profession (and Dr. Bailey makes the standard avowal that this book will not take the place of a good veterinarian) but when they write on their subject they are confronted with the cold fact that there are areas where there are no veterinarians and other areas where they are so overworked they can't handle the job. In all honesty, therefore, they must include treatments and cures. In this book, Dr. Bailey *does* include the symptoms, prevention, and treatment of various hog diseases grouped under chapter headings on contagious diseases, digestive troubles, mammary troubles, respiratory troubles, skin troubles, nervous troubles, urinary troubles, reproductive troubles, and others. He also has an excellent general chapter on the common chores such as castrating, vaccinating, restraining and holding, and other matters that both the owner and the veterinarian sometimes do. After a careful reading we feel that this is an excellent companion volume to Dr. Bailey's *Veterinary Handbook for Cattlemen.*

The Story of FAO, by Gove Hambidge, D. Van Nostrand Co., New York, $6.50.

When man invented the scythe to replace the sickle, agriculture took a giant stride forward. This invention meant that one man could do the harvesting four or five men formerly did. In the United States, where self propelled combines, forage harvesters, and tractor-drawn tillage machinery have long since displaced hand tools, a discussion of the relative advantages of a scythe over a sickle seems as strange as arguing which is faster, the turtle or the sloth. And yet, there are areas in the world where the scythe is a brand new invention and where the replacement of the mattock by the light, steel hoe or the introduction of a hand pushed garden plow are revolutionizing agriculture.

Acting as a midwife to the birth of this new life is FAO (Food and Agriculture Organization of the United Nations) whose workers are advising, demonstrating, and even financing in some cases,

(*Continued on page 74*)

GORMAN-RUPP Irrigation PUMPS

GORMAN-RUPP IRRIGATION PUMPS

Made in Various Sizes. G.P.M. varies with lbs. pressure. Continuous operation ranges follow. (Max. performance 15% to 20% greater.)

MODEL	ENG. MODEL	ENG. MFGR.	RECOMMENDED CAPACITY AND PRESSURE RANGE
For use with Farm Tractor Power Take-off Drive			
63A-G	3 inch Pump		Range varies with R. P. M.
64A-G	4 inch Pump		and H. P. of Tractor
Gasoline Engine Driven			
5201	22FB	B. & S.	80 gpm @ 80 lbs. - 175 gpm @ 40 lbs.
6301	22FB	B. & S.	135 gpm @ 50 lbs. - 315 gpm @ 20 lbs.
53M-TFD	TFD	Wisc.	140 gpm @ 70 lbs. - 300 gpm @ 35 lbs.
53H-VF4D	VF4D	Wisc.	225 gpm @ 85 lbs. - 400 gpm @ 40 lbs.
54A-VG4D	VG4D	Wisc.	225 gpm @ 95 lbs. - 550 gpm @ 50 lbs.
54M-134	CJ3A	Willys	250 gpm @ 120 lbs. - 600 gpm @ 55 lbs.
54M-CJ3A	CJ3A	Willys	250 gpm @ 105 lbs. - 600 gpm @ 55 lbs.
54B-6FB	6FB	Willys	325 gpm @ 120 lbs. - 800 gpm @ 50 lbs.
55A-265	IND-32	Chrysler	500 gpm @ 155 lbs. - 950 gpm @ 75 lbs.
55A-IND32	IND-32	Chrysler	500 gpm @ 150 lbs. - 925 gpm @ 75 lbs.
55M-IND24A	IND24A	Chrysler	600 gpm @ 160 lbs. - 1350 gpm @ 70 lbs.
55H-TDXC	TDXC	Herc.	800 gpm @ 160 lbs. - 1400 gpm @ 90 lbs.
610L	D-201	LeRoi	1250 gpm @ 45 ft. - 3500 gpm @ 22 ft.
612L	TDXC	Herc.	2250 gpm @ 80 ft. - 5250 gpm @ 22 ft.
Diesel Engine Driven			
55A	188D	Oliver	350 gpm @ 85 lbs. - 850 gpm @ 45 lbs.
55M	199D	Oliver	450 gpm @ 85 lbs. - 1100 gpm @ 45 lbs.
54A	DIX6D	Herc.	475 gpm @ 127 lbs. - 975 gpm @ 60 lbs.
55H	3031	G. M.	550 gpm @ 110 lbs. - 1300 gpm @ 60 lbs.
55H	4031	G. M.	550 gpm @ 110 lbs. - 1400 gpm @ 75 lbs.
55T	3031	G. M.	350 gpm @ 120 lbs. - 725 gpm @ 60 lbs.
55T	UD9A	Int. Harv.	325 gpm @ 135 lbs. - 825 gpm @ 75 lbs.
55T	DIX6D	Herc.	350 gpm @ 165 lbs. - 825 gpm @ 65 lbs.
55T	3031	G. M.	300 gpm @ 155 lbs. - 825 gpm @ 80 lbs.
55T	UD16A	Int. Harv.	300 gpm @ 165 lbs. - 900 gpm @ 80 lbs.
55T	4031	G. M.	300 gpm @ 165 lbs. - 900 gpm @ 95 lbs.
55T	188D	Oliver	250 gpm @ 105 lbs. - 700 gpm @ 45 lbs.
55T	199D	Oliver	250 gpm @ 140 lbs. - 750 gpm @ 75 lbs.
610L	UD-6A	Int. Harv.	1250 gpm @ 55 ft. - 3750 gpm @ 21 ft.
612L	UD-16A	Int. Harv.	2500 gpm @ 65 ft. - 6000 gpm @ 25 ft.

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THE GORMAN-RUPP CO.
MANSFIELD, OHIO

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I want to know more about Engineered Irrigation.

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Lake ☐ River ☐ Ditch ☐ Ponds ☐ Well ☐

Pulls Better . . . Lasts Longer!

THE Firestone DEEP TREAD

YOU are time and money ahead when you equip your tractor with new Firestone "Deep Tread" tractor tires.

You get more work done with the Firestone "Deep Tread" because the deeper curved bar center bite and big, powerful shoulders give maximum drawbar pull in any soil condition.

You get longer tire life because the Firestone "Deep Tread" has more tread rubber than other tires in its low price range. You save with extra hours of service.

Let your Firestone Dealer or Store show you the many other advantages of the Firestone "Deep Tread" tractor tire.

Compare before you buy . . . no other tractor tire gives so much for so low a price.

GET FAMOUS FIRESTONE TIRES FOR YOUR TRUCK OR CAR

Always buy tires built by Firestone, originator of the first practical pneumatic tractor tire

Enjoy the Voice of Firestone on radio or television every Monday evening over ABC

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now! harvest NON-STOP

NEW "BIG-BIN" MODEL 66
UNLOADS ON-THE-GO
$1250
complete with PTO attachment, f.o.b. factory

Again Allis-Chalmers brings you a sweeping harvest improvement, to ease your work and put more bushels in the bin . . . faster.

The new 25-bu. BIG-BIN holds over 1/3 wagonload. Unloads *on-the-go*. Control it from the tractor seat. Empties faster, with new longer, big-capacity auger . . . hinged to raise vertically for transport.

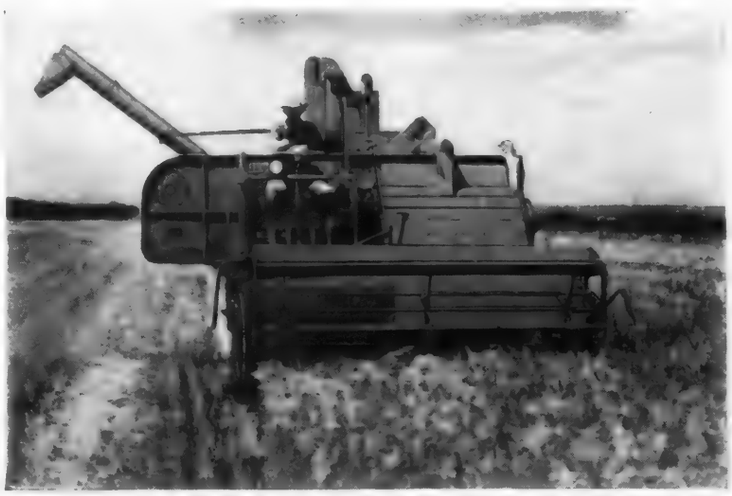
You can roll out the bushels nonstop with your own "BIG-BIN" ALL-CROP. When your crop is ready and minutes count . . . move fast and *keep* moving.

Go after those extra bushels. Change to a "BIG-BIN" ALL-CROP . . . priced so you can pay for it easily with your own home-harvested crops.

BOTH TRUE ALL-CROP HARVESTERS

Self-propelled Model 100
with POWER-CRATER engine
$4095 with 9-ft. header, f.o.b. factory
(12-ft. available)

Powered by the dynamic WD-45 POWER-CRATER engine. Handles with matchless ease. Conveniently grouped controls for field travel, cylinder speed, cutting height and reel adjustment—all at the operator's finger tips. Has true ALL-CROP ability in over 100 crops . . . big-capacity performance that has made Allis-Chalmers the most wanted name among all combines.



POWER-CRATER and ALL-CROP are Allis-Chalmers trademarks.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

RIGHT NOW...

GET IT WITH THE FERGUSON 35

EXCLUSIVE 4-WAY WORK CONTROL
lets you farm more, work less

1. QUADRAMATIC CONTROL
for Lift control, double-acting Draft control, Response control and Position control.

2. DUAL-RANGE TRANSMISSION
provides six forward speeds; two reverse speeds; fits tractor speed exactly to the work.

3. "2-STAGE" CLUTCHING
controls tractor movement and live PTO with a single foot pedal.

4. VARIABLE-DRIVE PTO
provides drives in ratio to tractor ground speed, or to tractor engine speed.

You've heard of the brilliant new Ferguson "35", of course. Now try it yourself . . . on your own farm. Get the feel, at first hand, of exclusive 4-Way Work Control at work *for you!*

And that's not the whole new story of this years-ahead tractor by any means. The "35" also gives you other advanced features such as High-Torque Engine . . . Recirculating Ball-Nut Steering . . . Sight-Glance Tractormeter . . . Compensating Overload Release. *Plus* many other Ferguson benefits.

Get set for a new appreciation of how flexible a tractor can be in all-around performance. How handy its fingertip operation. How selective and wide-ranging its controls. Seeing is believing . . . but a *tryout*, in person, is even more convincing. Call your Ferguson Dealer now to arrange just such a demonstration.

Ferguson, Racine, Wis.

go years ahead / **GO FERGUSON**

the original self-propelled forager

will cut more tons per day than any other harvester

Up to 40 tons of corn per hour with row-crop head . . . 5 to 7 acres per hour of sown feeds, legumes, alfalfa with mower bar head . . . 3 to 6 acres per hour of windrowed hay with pick-up head. That's Krause Forager performance . . . as proved by years of experience. First in the field with all 3 quick-change cutter heads, the versatile, maneuverable Forager leads in high performance for lowest-cost harvesting . . . makes money for you all season long. Extra quality construction for heavy-duty service, minimum upkeep. Gasoline or Diesel power.

54" pick-up head gets 3 to 6 acres/hr of windrowed hay; replaces 2-row 40-ton/hr ensilage head.

7-ft. mower bar head harvests 5 to 7 acres/hr of sown crops, legumes. Ideal for dehydrators.

KRAUSE®

Rugged-built tillage equipment

TANDEM DISC HARROW on rubber-tired wheels handles toughest jobs quickly. Precision leveling screw; positive lift and depth control; wide-range, easy angle adjustment. 7 models, 18 sizes.

CHISEL speeds many tillage jobs — loosens soil, mulches, breaks up subsurface hardpan. Rubber-tired wheels; interchangeable points, spikes or sweeps. Hydraulic lift; 9 to 17-shank "2-in-1" sizes.

220 ONE-WAY with pivot action lift pulls easier to plow more acres per day. Positive depth control; simple adjustments. Extra weight, extra strength; anti-friction bearings. Sizes 13 to 27-disc 9 ft. to 17½ ft.; 24" discs, 9" spacing.

Can you make money with a Krause Forager on your farm? Send for the "Harvesting Analysis Questionaire", fill it out and mail it to Krause. Thousands of hours of operation have provided Krause with a substantial file of operating cost data. From this data an accurate projection of your "cost and profit" can be made to help you decide if the FORAGER will be a sound investment.

You will receive a complete Harvesting Analysis of your operation showing just what Cost-Profit-Production you could expect from a Forager.

Send for this FREE Service.

KRAUSE PLOW CORPORATION, 399 South Monroe, Hutchinson, Kansas

Send me free information about:

- ☐ Krause Forager
- ☐ Krause Disc Harrow
- ☐ Krause Chisel-Tiller
- ☐ Krause K-5 One-Way
- ☐ Harvesting Analysis Questionnaire

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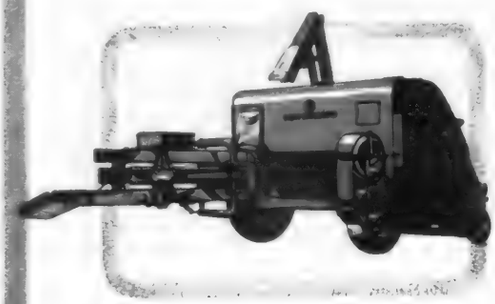
ANNOUNCING!

A new and faster wire-tie!



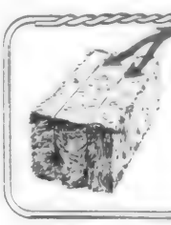
NEW HOLLAND'S Model "87"

Packages up to 12 tons an hour! Builds compact 125-lb. bales!

If you want full weight, wire-tied bales that can take plenty of handling and abuse . . . and if you want 'em fast, the Model "87" is your baby.

This rugged new machine bales up to 12 tons an hour . . . ties bale after bale without a miss . . . takes the slam bang of fast operation without a falter all season long.

See your New Holland Dealer for full details. He's your headquarters for all that's new in grassland machines and information.



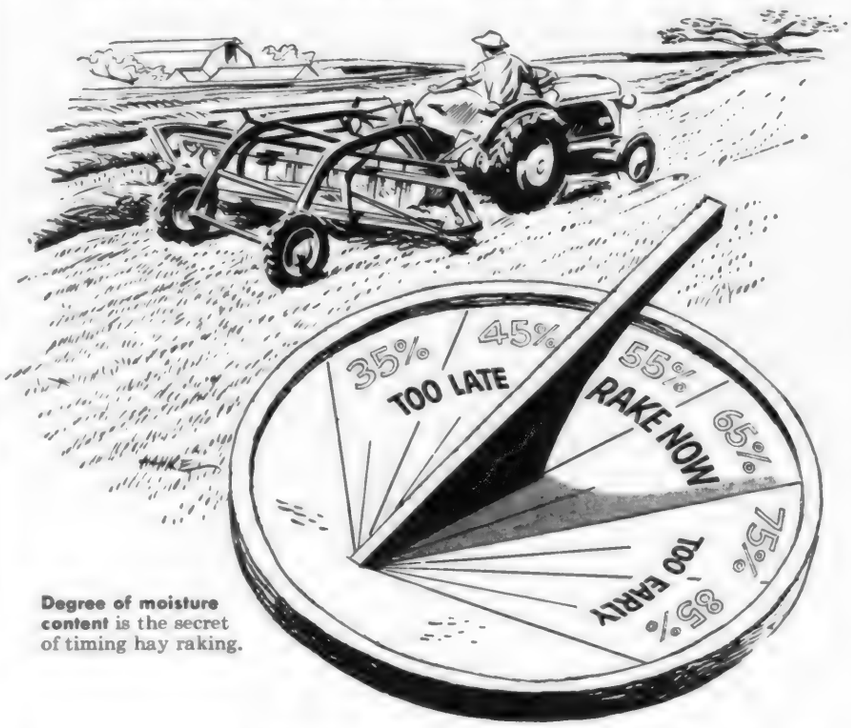
Tied for Keeps! with the exclusive "In-line" twist

The fast spinners of New Holland's wire-tie mechanism tie a straight line twist of eight full turns that takes hundreds of pounds' pull. The twist lies flat on the bale, won't snag hands or clothing. There are no wire clippings to drop into the bale.

NEW HOLLAND®
"First in Grassland Farming"

For better quality baled hay . . .

Know when to rake!



Degree of moisture content is the secret of timing hay raking.

When you rake at the right time, you save more of the protein-rich leaves that are worth hundreds of dollars in feed value . . . can cut the cost of your milk or beef production. But if you leave your hay baking in a hot sun too long before you rake, you may lose as much as one third of this feed value.

Why is this? The quality of alfalfa hay, for example, depends heavily on the amount of leaf shatter during harvesting. This is because most of the protein, carotene and other nutrients *are in the leaves.* And raking when the hay is too dry increases leaf shatter.

A California study shows that alfalfa hay should be raked when its moisture content is between 55% and 65%. Here's why. Above 55% moisture content, the raking action just knocks off diseased leaves and trash, parts you don't want in your hay anyway. But below 55%, with leaves drying faster than the stems, leaf loss increases sharply.

In these tests, protein loss followed leaf loss closely because the shattered leaves were high in protein content. Protein loss due to shattering was very low when the moisture content was above 55%. When moisture content dropped from 55% to 30%, protein content was *cut in half!*

How does this tie in with your own haymaking? It points up the need for a high-speed rake that can prepare a whole field for harvesting just as soon as the right moisture content has been reached . . . build quick drying windrows with minimum leaf shatter.

New Holland's Rolabar Rake, for example, was designed to run at tractor speeds up to 8 m.p.h. Yet its exclusive 5-bar reel keeps reel speeds low to rake hay gently. This gentle raking action at high speeds means you save more hay leaves for your livestock. Fields are ready for baler or chopper quickly.

Compact "66" twine-tie P.T.O. bales up to 7 tons an hour with a 2-plow tractor!

Bale...after bale...after bale—*without a miss!*

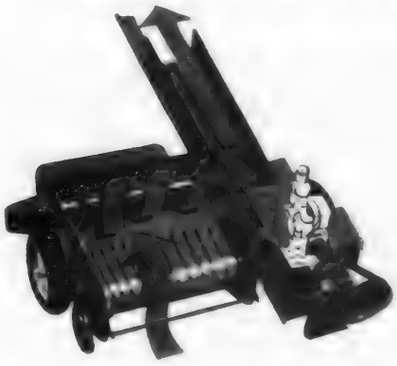


Diagram shows New Holland's direct-flow baling system. *Floating Pickup* is fast and positive. *Rigid Feed Auger* gently whisks hay or straw to bale chamber. *Adjustable Wadboard* folds this hay or straw just right for firm, well-shaped bales. *Field-proved Knotters* tie bale after bale without a miss.

New Holland Twine is Certified by U. S. Testing Co. for strength and length. It ties more bales, cuts time-wasting breakdowns. Now at a new low price!

One run down the windrow will convince you . . . New Holland's Compact "66" is the easiest handling, sweetest running baler on the market!

The "66" will package up to 7 tons an hour . . . bale any kind of hay. Yet it is so compact that it stores almost anywhere, slips through narrow gates.

P.T.O. model is one of the lowest price balers on the market. An overrunning clutch protects the tractor gears from baler momentum . . . lets you match ground speed to baling speed in an instant. Engine-powered model operates with a 1-plow tractor.

See your New Holland Dealer. He's your headquarters for grassland farming information. He carries a complete line of twine-tie and wire-tie balers—with capacities up to 12 tons an hour! He can show you the baler that's just right for your farm. The New Holland Machine Co.

Free Catalogs! For information on New Holland's "66", "Super 77" or "87" balers, write: New Holland Machine Co., 906 Elm Street, New Holland, Pennsylvania.

For larger hay acreages, for custom baling, see the "Super 77" . . . bales up to 12 tons an hour! Available in both P.T.O and engine-powered models.

NEW HOLLAND

"First in Grassland Farming"

New Holland, Pa. • Minneapolis • Des Moines • Kansas City • Columbus • Charlotte • Lockport • Denver • Nashville • Syracuse • Brantford, Ontario

The Dairy Barn

Maw's Choppers

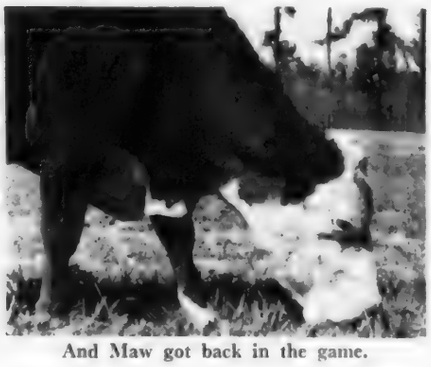
When a cow loses her choppers that's the end of her—if she can't eat grass she can't produce milk, and off goes her head. But with Maw things were different. Maw belonged to Dr. Jesse Emerson, Gainesville, Florida, and Dr. Emerson loved Maw. When Maw fell off in milk, Dr. Emerson, being a dentist, looked to her teeth.

This is what he found.

He made a cast of Maw's mouth.

And came up with this bridge.

Which he neatly fitted to Maw's jaw.



And Maw got back in the game.

We would like to report that Maw lived happily ever after, but unfortunately the old teeth which anchored Maw's bridge gave out and that was the end of her store teeth—and presumably the end of Maw too.

(THE DAIRY BARN *continued on page* 76)

THEY'RE bulk MILKERS

PHOTO COURTESY OF ALLIS-CHALMERS AND MAJONNIER

Deep-bodied, big-capacity Registered Holsteins turn bulk forage into bulk milk. They're the real, efficient converters of low-cost roughage into large quantities of milk per cow.

Just look at this thrifty dairy herd. The thing that catches your eye is the tremendous capacity of heavy-milking Registered Holsteins for green-chopped feed . . . the way they go after that kind of feed and convert it into milk at low cost. But it's the same story the year 'round for Registered Holsteins on roughage.

Milk per cow at low cost—that makes the difference today. It's Registered Holsteins that do the job. They'll do it for you on your farm.

HOLSTEIN-FRIESIAN ASSOCIATION OF AMERICA • Brattleboro, Vermont

Breed of the Times

REGISTERED HOLSTEINS

Wheels by French & Hecht Division of Kelsey-Hayes

for the workhorses of modern agriculture

From the monsters of the fields to the highway vehicles that whisk the final product off to market —wheels are vital to the speed and efficiency of modern mechanized farming.

Making wheels for agriculture is a Kelsey-Hayes specialty that started 67 years ago at the French & Hecht Farm Implement and Wheel Division in Davenport, Iowa. **Kelsey-Hayes Wheel Company, Detroit 32, Mich.**

KELSEY HAYES

World's Largest Producer of Automotive Wheels

Wheels, Brakes, Brake Drums, Special Parts for all Industry • 9 Plants — Detroit and Jackson, Mich.... McKeesport, Pa....Los Angeles...Windsor, Ont., Canada...Davenport, Ia. (French & Hecht Farm Implement and Wheel Div).

20 bad weeds

A WEED is a plant, often a good plant, in the wrong place. One of the big and costly jobs of farming is keeping the right plants in the right place. Weeds rob crops of moisture and plant nutrients, they poison livestock, damage and dilute the value of hay and forage, smother out field crops, harbor insects, and dip into our pocketbooks for labor, machinery, and chemicals to fight them.

Fully 80 per cent of all our weeds were brought into the country from abroad. During the last 150 years we have imported at least one alien weed enemy each year. Some, like Johnson grass, we brought in as a forage crop; it escaped, ran wild, and is now an enemy. Some were brought in as houseplants and escaped to the fields. Some were hidden in the cuffs of travelers' trousers, in their shoes, in the packing around foreign merchandise, on the feet and in the digestive tracts of animals and birds. Once they get a start, they are spread by contaminated crop seeds, by wind, running water, animals,

(*Continued on page* 108)

1 CORN COCKLE (Corn rose, corn campion, purple cockle, old maid's pink) A winter annual, growing from seeds. A pest in grain fields. Flour from cockle infested wheat is unpalatable and screenings containing seed will poison livestock. Seeds rarely live longer than one year in the soil. Follow rotation with wheat not oftener than once in four years. Rogue grain fields, clip waste land before seeds form. No selective chemical.

2 QUACK GRASS (Witch grass, wheat grass, knot grass, devil's grass) A perennial growing from seeds and root stocks. Latter sends out shoots at the joints. Has some use as a pasture plant and soil binder, but is a robber in cultivated crops. Cultivate clean, graze close, harrow and spray with TCA, 25 lbs. to the acre. Cultivate after spraying.

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3 CURLEY DOCK (Sour dock, yellow dock) A perennial. Reproduces from seeds and leaf crown. Seeds mature by midsummer. Has a very deep tap root. Grows anywhere and uses a great deal of moisture and plant food. Dig out isolated plants. Cultivate clean and spray with 2, 4-D when plants are 4 to 10 inches high. Clipping will prevent seeding, but not growth from crown. Leaves often used as spring greens. **4** LAMBS QUARTERS (Fat bacon, pig weed, bacon weed, meal weed) An alien from Eurasia. Common everywhere, spreading chiefly from contaminated crop seed. An annual, reproducing from seeds. Cultivate clean and harrow when seedlings are small. Seedlings easily killed by 2, 4-D, one-half pound to the acre. Sheep will keep down in pastures. Relished by livestock, and a component of spring greens. **5** PIGWEED (Red root, chinaman's greens, amaranth) One of the commonest weeds in gardens and fields. Steals a great deal of nitrogen from crops. An annual producing thousands of seeds. Harrow cultivated fields to stimulate seedling growth, then clean cultivate, then follow with smother crop such as alfalfa or clover. Clip plants in waste places before seeds form. 2, 4-D as a pre-emergence spray or Sinox in growing crops are effective. **6** WILD CARROT (Bird's nest, Queen Anne's lace, lace flower, whitetop) A biennial, producing seeds in its second year. Slightly toxic with a deep tap root. Will take over a meadow after hay has been cut. Spreads rapidly from waste places. Mow meadows and waste land before seeds form. For bad infestations, plant a second cultivated crop. Spray in the fall with 2, 4-D. **7** BINDWEED (Field bindweed, creeping Jenny, pea vine) Likes rich soil, thrives under cultivation. Especially bad in corn fields where its extensive root system robs the soil of moisture and plant food. A perennial, spreading from seeds and roots. Seeds contaminate wheat and oats seed. Cultivate to bring roots to surface, then spray with 2, 4-D. Spray again when in bloom, later when plants are 4 to 10 inches high. Smother out with a dense crop. **8** HORSE NETTLE (Bull nettle, sand brier, wild tomato) A spiney, deep-rooted perennial bearing yellow or brown fruit the size of a pie cherry. Propagates both from seed and creeping rootstocks. Spreads rapidly and can take over a field. Spray with sodium chlorate in July and September. In early bloom stage 2, 4-D is effective. In pastures use half and half mixture of 2, 4-D and 2, 4, 5-T. Cultivate often and smother out. A member of the nightshade family, is slightly toxic to livestock. Seeds often contaminate alfalfa and red clover seed.

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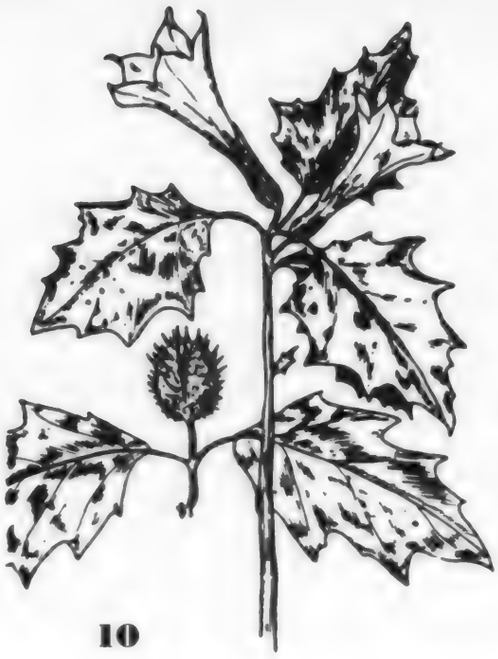

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9 BUCKHORN PLANTAIN (English plantain, rib grass, buck plantain, ribwort) A perennial reproducing from seeds and shoots from roots. A pest in lawns, grass and legume crops. Produces prolific seeds all during growing season, even when disturbed. Plow under meadows, cultivate clean for two years. Early in summer, before flowering, spray with 2, 4-D at 2 lbs. to the acre. A drop of sulphuric acid on the crown of single plants will kill. **10** JIMSON WEED (Jamestown weed, thorn apple, mad apple, stinkwort) An annual growing from seeds maturing in late summer. Likes rich soil of fence corners, river bottoms. Extremely poisonous to livestock, which shun the mature plants but may eat seedlings and small plants. Grub out mature plants and burn. When growth is flourishing, 2, 4-D will kill. **11** RAGWEED (Wild tansey, bitterweed, blackweed, wild hemp) An annual growing from seeds. The scourge of the hay fever victim, it flourishes in meadows and growing crops and grain fields, especially after the crop is off. Clip pastures before seeds have formed and grain fields after harvest. Plants are killed by 2, 4-D before blooming. An infested fence row can contaminate a whole farm. **12** COCKLEBUR (Clothbur, sheepbur, buttonbur) An annual reproducing from seeds. Widespread, especially in river bottoms. Seedlings somewhat poisonous to livestock, especially swine. Cultivate clean, clip seedlings. Seedlings easily killed by 2, 4-D and other broad leaf chemicals. Spray when young. **13** DOWNY BROME GRASS (Early chess, wild oats, military grass) An annual or winter annual, growing from seeds and plants of previous season. Matures early before other plants have a chance to smother. Livestock will eat when young, but awns cause injury to eyes and digestive tract. Clip when heads open and again two weeks later. TCA will kill but is not selective. Harrow infested meadows, clip waste places and burn. **14** CANADA THISTLE (Canadian thistle, creeping thistle, cursed thistle) Public enemy No. 1 and not Canadian at all, but a native of Europe. A perennial growing from seed and root stocks, with a purple flower. Seeds are suspended from a parachute and are blown great distances. Every part of the root will produce a shoot. Some plants produce seeds, some do not. A spray of 2, 4-D applied between the late roseate and pre-bud stage is effective, as is sodium chlorate applied at early bloom stage and again in September. This attacks the root system. Go after deep roots with sweeps. Alfalfa and dense grasses will smother out eventually. Do not allow to flower.

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15 RUSSIAN KNAPWEED (Spotted knapweed, Turkestan thistle) A perennial with tough, rapidly spreading rootstocks. Purple flowers similar to bachelor buttons. Seeds in late July and can quickly take over a field. Highly resistant to 2, 4-D, but succumbs to several sprayings of sodium chlorate or Altacide. Summer fallow, harrow repeatedly, and follow with a smother crop such as alfalfa or soybeans. Clover and alfalfa seed are often contaminated with knapweed seeds. **16** WILD MUSTARD (Winter cress, field kale, field mustard, charlock) An annual, worst following a wet spring, when it may blanket a field. Grows only from seed borne in small pods. Blooms early and long and one plant may bear seeds, flowers, and unripe fruit at the same time. Seeds may live 40 years in the soil. Clip, spray with 2, 4-D before flowering. **17** FOXTAIL (Wild millet, pigeon grass, summer grass, bristle grass, bottle grass) Foxtail comes in three varieties, green, yellow and giant, all annuals reproducing from seed. Its seed contaminates small grain seed and is difficult to clean out. Sheep will keep down. Clip before seeding. Resistant to 2, 4-D, but TCA will kill. **18** WILD ONION (Wild garlic, meadow garlic, crow garlic) A bad actor and a perennial, growing from seeds, bulbs and aerial bulblets. Has not only common evils of a weed, but will contaminate milk and lowers the value of wheat. Winter plowing, followed by a clean cultivated crop, and spraying in spring with 2, 4-D to catch survivors will help control. Follow with a fall spraying after cultivation with duck foot cultivator to bring bulbs to surface. Seeds will live for years in the soil. Keep out of fencerows. **19** WILD PEPPERGRASS (Bird's pepper, tongue grass, poor man's pepper) One of numerous members of the mustard family. An annual or winter annual, it produces flowers when quite young. Spring plowing followed by clean cultivation will help control. Infested fields should not be sown to oats or wheat. Will succumb to 2, 4-D. A close relative, perennial peppergrass, is killed by a chlorate spray. **20** LEAFY SPURGE (Faitor's grass, tithmal) A relatively new perennial spreading from seeds and an extensive root system. Seed pods explode seeds up to 30 feet from the plant. Resistant to 2, 4-D but controlled by amate, borax compounds and sodium chlorate. Clip before seeding, summer fallow and work frequently. Close pasturing with sheep, which eat it will relish, and a smother crop such as clover or alfalfa will help keep down in pastures.

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Farm Pumps

When the wind was put to work pumping water it was a big improvement over lifting it by hand; today, dependable electric pumps keep the farmer supplied with water -- without backaches or west winds

WATER PUMPS are built to take it, year after year. When a farm pump doesn't give satisfactory service, usually it isn't the right type of pump for the job. Let's have a look at how pumps operate before selecting one for your farm water supply.

For home water systems, manufacturers offer two kinds of pumps, shallow well and deep well. Actually they may be very much alike, differing only in manner of installation.

All pumps both suck in and push out water. Shallow well pumps rely on sucking action to bring water from the well. When the water level is too deep, a pumping unit of the same essential design can be placed below the water level to push the water to the surface.

The name "shallow well pump" is misleading. Pumps of this type operate from wells, springs, cisterns, ponds, or any source of water where the lift from water to pump is not more than 22 feet. Beyond that depth, a deep well pump is required.

When a shallow well pump starts up, a vacuum is created in the pipe above the water. Atmospheric pressure forces the water up the pipe to fill the vacuum. That's where the dividing line of 22 feet between shallow and deep well pumps comes in. It is the practical limit, at sea level, for any pump to *suck* water. For each 1200 feet above sea level, the limit is reduced one foot by atmospheric conditions. But pumps can be built to *push* water to almost any height.

A dealer won't recommend a shallow well pump just because you tell him you have a well with water, say, within 10 or 15 feet of the ground level. A number of other details have to be considered and it takes a bit of figuring. If you expect a pump to supply water season after season, the water level in your well must remain within 22 feet of the surface under pumping withdrawals, or a shallow well pump will prove disappointing. On the other hand, if underground water pressure in a 500 foot deep well keeps ample water within 22-foot suction range, you can use a shallow well pump on such a deep well. But it is the rare farmer who can boast of a water supply that good.

To select a pump, the first requirement is to know where it is to be placed. If a 10-foot deep cistern provides sufficient water, but the pump must be placed in a building on ground 20 feet higher than the top of the cistern, a shallow well pump won't work. The total suction lift would be 30 feet, and a deep well pump would be required. Horizontal runs of pipe from well to pump, unless exceeding 50 feet, need not be considered in connection with 22-foot suction limits.

It's a pump dealer's job to recommend a suitable water system to meet conditions. But you'll know what to look for if you have a working knowledge of how pumps operate.

Pump Types

All pumps, whether shallow well or deep well, come in two basic designs. One type operates by displacement. The second operates by centrifugal force.

If you push a broomstick into a pipe, you have wood displacing air. The stick is a plunger or piston; the pipe is like the cylinder of a piston pump. The displacement is positive—the amount of air coming out of the filled pipe will always be the same as that displaced by the broomstick. The pressure of the air coming from the other end of the pipe is the same as the pressure you apply to the broomstick.

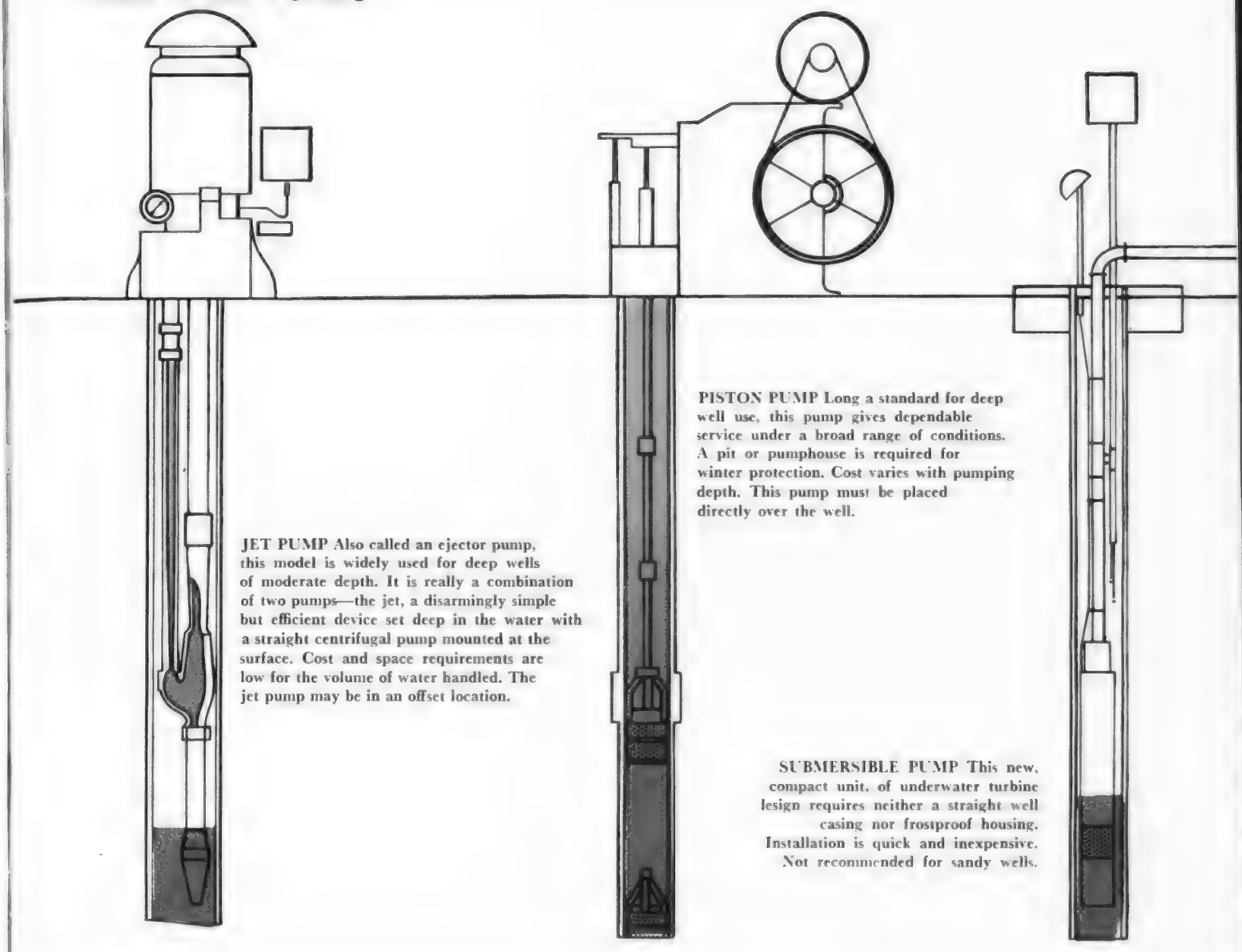
In a displacement pump, the higher the pressure the greater horsepower is required of the motor driving it. But the amount of water delivered does not change. You can expect a properly installed 400-gallon per hour displacement pump to deliver very close to that much water, whether pumping from a 5 or a 20-foot suction depth, or to a 20 or 40-pound pressure.

The Whirling Pumps

Centrifugal pumps operate somewhat like the whirling blades of a manure spreader. The faster you drive, the farther you throw the manure. Light bedding offers little resistance against the blades, so you're unloaded quickly. In similar manner, centrifugal pumps, working against low pressures, will deliver large quantities of water quickly. Increase the pressure and the

(*Continued on page* 96)

DEEP WELL PUMPS

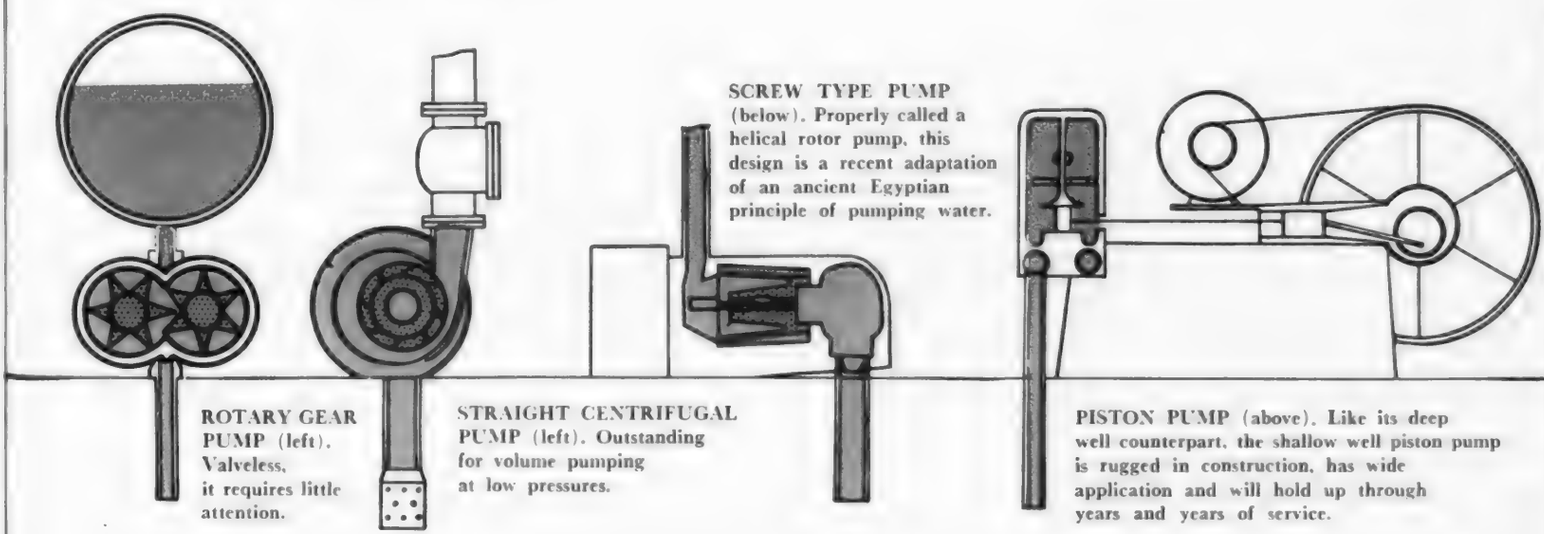


JET PUMP Also called an ejector pump, this model is widely used for deep wells of moderate depth. It is really a combination of two pumps—the jet, a disarmingly simple but efficient device set deep in the water with a straight centrifugal pump mounted at the surface. Cost and space requirements are low for the volume of water handled. The jet pump may be in an offset location.

PISTON PUMP Long a standard for deep well use, this pump gives dependable service under a broad range of conditions. A pit or pumphouse is required for winter protection. Cost varies with pumping depth. This pump must be placed directly over the well.

SUBMERSIBLE PUMP This new, compact unit, of underwater turbine design requires neither a straight well casing nor frostproof housing. Installation is quick and inexpensive. Not recommended for sandy wells.

SHALLOW WELL PUMPS



ROTARY GEAR PUMP (left). Valveless, it requires little attention.

STRAIGHT CENTRIFUGAL PUMP (left). Outstanding for volume pumping at low pressures.

SCREW TYPE PUMP (below). Properly called a helical rotor pump, this design is a recent adaptation of an ancient Egyptian principle of pumping water.

PISTON PUMP (above). Like its deep well counterpart, the shallow well piston pump is rugged in construction, has wide application and will hold up through years and years of service.

Claud Hall turned 10,000 acres of scrub forest into good pasture last year with his spray planes
For $17 any farmer can put the new chemical methods to work and add acres to his farm

Miracle in the Southwest

By Fred Knoop

"ANYTHING that will kill an Ozark sprout will kill a man—for sure. And anyhow, nothing will kill an Ozark sprout." These sure words of an old-timer ended an indignation meeting in a small Arkansas town in 1950. The meeting had been called because a chemical company was planning to run a series of brush-killing tests using hormone sprays on 2,000 acres it had just bought nearby. As the facts turned out, the farmers were wrong on both counts. Today they welcome the flyers of the lumbering spray planes as public benefactors, which they are. For they are turning brush-country into grass again.

If you have ever been in Arkansas, you'll know that a sprout is anything of a woody nature—from the fat-boy scrub oak to the 40 foot shagbark hickory. All sprouts have several things in common: they are hard to kill: they put out such a dense cover of leaves that nothing will grow underneath them: they spring up when the land has been overgrazed or mistreated. In the Ozark area alone—southern Missouri, western Arkansas, northeastern Texas and eastern Oklahoma—it is estimated that there are 30 to 40 million acres that could well be grazing land again. Much of this land was once grazing land: it is not forest land like that to the east, nor is it range land like that to the west. Soil Conservation Service men have long known that portions of this area was true prairie, and that once the shade is removed, the native grasses will again grow tall enough to meet a steer's eye.

Why did this land turn into a jungle of low-grade trees? There are several causes for its downfall, soil scientists and forestry men say. First, the overgrazing: second, the removal of organic matter by the indiscriminate burning: and third, no fertilizer or nutrients of any kind have ever been put back on the land. This is the land that Coronado described in his march through the area in 1570 as "tall grass prairie country." As late as 1832, surveyors had trouble in finding trees here on which to blaze their lines.

Since 1950 this area has been the scene of the big battle with the brush, a testing ground for the chemical companies. The results that have come out of the area are just about as important to many farmers as the invention of the plow. In a nutshell, the facts are: for $8 an acre land can be sprayed with chemicals and a kill made on 75 to 95 per cent of the trees and brush: about 15 months after the chemical treatment, cattle can be grazed on the native grass that springs up: land that had trouble in carrying one cow on 100 acres before spraying will support a cow on 8 to 12 acres after the trees are killed; the spray is selective; it knocks out the broadleafed hardwoods, but will not kill the useful pines.

Brush to Grass in a Year

L. H. King of Clarksville, Arkansas, cooperating with the Johnson County Soil Conservation District, has had a chance to try out land clearing by a variety of methods over the past 20 years. His 800 acres of peaches—"grown on the sunny slopes of the Ozarks"—are planted on hills that

WEED AND TREE KILLING CHEMICALS AND THEIR SUGGESTED USES

Trade Designation	Chemical Composition	Selective or Non-Selective	Annual	Perennial	Grass Type	Broad Leafed	Pre-emergence or Contact
A-A	allyl alcohol	NS					PE
Alanap	imid of N-1 naphthyl phthalamic acid	S			x	x	PE & C
Amino triazole	3-amino-1,2,4-triazole	NS	x	x	x	x	C
Ammate	ammonium sulfamate	NS	x	x	x	x	C
Arsenious comp	arsenic trioxide	NS	x	x	x	x	C
	sodium arsenite	NS	x	x	x	x	C
Borax	sodium borate; sodium metaborate; sodium pentaborate; sodium tetraborate	NS	x	x	x	x	C
Chlorate	sodium chlorate	NS	x	x	x	x	C
Chloro IPC	isopropyl N 3-chloro phenyl carbamate	S	x		x		PE
Crag #1 (SES)	sodium 2,4-dichlorophenoxy-ethyl sulfate	NS	x		x	x	PE
Cyanamid—Gran	calcium cyanamide	NS	x		x	x	PE
Cyanamid—Pulv.	calcium cyanamide	S	x			x	PE & C
Cyanate (KOCN)	potassium cyanate	S	x		x	x	C
Dalapon	2,2-dichloropropionic acid (sodium salt)	S	x	x	x		PE & C
Diethyl phthalate			(Suggested uses not yet available.)				
Dinitros	sodium dinitro ortho cresolate	NS	x		x	x	
	dinitro ortho secondary amyl phenol	NS	x		x	x	
	dinitro ortho secondary butyl phenol	NS	x			x	C
	ammonium dinitro ortho secondary butyl phenate	S			x	x	C
	ammonium dinitro ortho secondary butyl phenol						
Endothal	disodium 3, 6-endoxohexahydrophthalate	S	x		x		C
HC-1281	trichloro benzoic acid isomers	S					PE
HCA	hexachloroacetone	S	x	x	x		C
Hydrocarbons	Compounds consisting essentially of carbon and hydrogen. The important classes of hydrocarbons are paraffins, naphthenes, olefins and aromatics. Ordinary commercial products, derived from crude oil, are normally made up of these four classes of compounds in varying proportions.						
IPC	isopropyl N-phenyl carbamate	S	x		x		PE
Karmex W	3-(p-chlorophenyl)-1, 1-dimethylurea	S & NS	x	x	x	x	PE
Karmex DL	3-(3, 4-dichlorophenyl)-1, 1-dimethylurea	S			x	x	PE
Karmex FW	3-phenyl-1,1-dimethylurea	NS	x	x	x	x	PE
Kuron	2-(2,4,5-Trichlorophenoxy) propionic acid, Propylene Glycol (C_3H_8O to $C_5H_{12}O_2$) Butyl Ether Esters 2-(2,4,5-Trichlorophenoxy) propionic acid	S	(for woody plants)			x	C
MCP	2 methyl 4 chloro phenoxy-acetic acid	S	x	x		x	C
	2 methyl 6 chloro phenoxyacetic acid	S	x	x		x	C
MH	maleic hydrazide	S	x	x	x		C
Natrin	sodium 2,4,5 trichloro phenoxy ethyl sulfate	NS	(Suggested uses not yet available.)				
NIX	sodium isopropyl xanthate	S	x	x	x	x	PE & C
Oils (herbicidal)	petroleum naphtha		x		x	x	C
Oktone	octochloro cyclohexenone	NS	x	x	x	x	PE & C
PCP	pentachlorophenol; sodium pentachlorophenate	NS	x		x	x	C
PMAS	phenyl mercuric acetate	S	x		x		C
Premerge	alkanolamine salts (of the ethanol and isopropanol series) of Dinitro-o-secondary butyl phenol	NS	x		x	x	PE & C
Sesin	2,4-dichlorophenoxyethyl benzoate	NS	(Suggested uses not yet available.)				
Silvex	2-(2,4,5-Trichlorophenoxy) propionic acid	S				x	C
Stoddard Solvent	mixed hydrocarbons	S	x		x	x	C
Sulfasan	ethyl xanthogen disulfide		(Suggested uses not yet available.)				
TCA	trichloroacetic acid salts	S	x	x	x		PE
Telvar W	3-(p-chlorophenyl)-1, 1-dimethylurea	NS	x	x	x	x	PE
Telvar DW	3-(3,4-dichlorophenyl)-1, 1-dimethylurea	NS	x	x	x	x	PE
2,4-D	2,4-dichiorophenoxyacetic acid	S	x	x		x	PE & C
2,4,5-T	2,4,5-trichlorophenoxyacetic acid	S	x	x		x	PE & C

ESTIMATED ACREAGE OF LAND ON WHICH BRUSH REMOVAL CAN IMPROVE GRAZING*

State	Number Acres Could Be Cleared	Percent of State Area	State	Number Acres Could Be Cleared	Percent of State Area
Alabama	2,250,000	7	Nebraska	64,000	.1
Arizona	16,000,000	22	Nevada	10,000,000	14
Arkansas	10,000,000	30	New Hampshire	500,000	9
California	13,000,000	13	New Jersey	150,000	3
Colorado	7,000,000	10	New Mexico	16,000,000	21
Connecticut	100,000	3	New York	1,500,000	5
Delaware	2,000	.2	North Carolina	2,000,000	6
Florida	8,000,000	23	North Dakota	150,000	.03
Georgia	5,000,000	13	Ohio	300,000	1
Idaho	8,000,000	15	Oklahoma	6,500,000	16
Illinois	750,000	2	Oregon	8,000,000	13
Indiana	1,000,000	3	Pennsylvania	1,000,000	3
Iowa	1,000,000	3	Rhode Island	30,000	5
Kansas	1,000,000	2	South Carolina	537,000	3
Kentucky	1,400,000	6	South Dakota	200,000	.04
Louisiana	5,000,000	17	Tennessee	1,000,000	4
Maine	950,000	5	Texas	65,000,000	39
Maryland	3,000	.05	Utah	8,000,000	15
Massachusetts	75,000	1	Vermont	150,000	3
Michigan	3,500,000	10	Virginia	250,000	1
Minnesota	5,000,000	10	Washington	1,000,000	2
Mississippi	1,500,000	5	West Virginia	125,000	1
Missouri	10,000,000	22	Wisconsin	5,000,000	14
Montana	1,000,000	1	Wyoming	8,000,000	13

Total acres of land that can be improved: 236,698,600
Percent of total U. S. Area: 8.66
* Based on estimates of State and Federal authorities

Hurlon Ray, S.C.S. range specialist, who has supervised much of the Arkansas work. The grass is Broadleaf Uniola.

This is the inexpensive basal bark method of killing trees. It can be done any time of the year with a hand sprayer.

were grubbed out the hard way. Nearby he has about 600 acres of land, 400 acres of which had been cleared in years past and this provided good pasture for his Black Angus cattle even through the drought years. This spring he walked through the 170 acres that had been sprayed from the air in May, 1954. With him was Hurlon Ray, the Soil Conservation Service range specialist from Fayetteville, Arkansas. As they pulled huge slabs of bark off the dead trees, King said, "I didn't think we could do it. Our kill on this brush is almost complete. I figured my total costs on this new pasture that we've got for our cattle. It cost $8.50 an acre for spraying, including the 2,4-D and the 2,4,5-T, along with the Diesel oil that it was mixed with. That did the job. But I am glad that we seeded it while there was plenty of moisture in those leaves. The aerial seeding cost $3.75 an acre—$3.25 for the seed and 50 cents for the plane. We used 10 pounds each of rye grass and crimson clover. It was like finding 170 acres of pasture—for $12.75 an acre is pretty cheap. We haven't fertilized the sprayed area yet. There is going to be plenty of mold and bark as those trees rot and fall down. Right now we have 250 Angus on the 600 acres, and if we get the rain I believe it will carry all of them well into the summer."

L. H. King is pasturing the land sooner than the Soil Conservation Service recommends. On the other hand, the land he has cleared is better than the average in Arkansas, and he gave it an extra boost by seeding it. The best way to put the land back in use, the range specialists believe, is to allow the native grass 15 months growth after the trees have been sprayed. That gives the grass a chance to seed itself twice, and recover from being suppressed by woody plants.

The Applicators

Claud Hall, of Clarksville, Arkansas, the Paul Bunyan of the aerial sprayers, got into the spraying business partly because he likes to fly and partly because he is a good businessman. His planes sprayed some 10,000 acres of brush last year and the tales of his effectiveness as an applicator makes good hot stove talk for the Arkansas farmers. A former Army Air Force low level acrobatics instructor, he is one of the rare people that can bring real enthusiasm to the faces of the Osage Indians when he is operating in Oklahoma. His wheels often roll from touching the tree tops and his turns at the end of a spray run are fast and precise. When he wants to give instructions to the ground crews, he puts the plane upside down and shouts his orders from the air. He is one of the few flyers that can cover 200 acres of brush with "acid" (the operator's name for the chemical spray) in an hour.

The flyer-operator like Claud Hall looks at the brush-killing business as a trucking job with disagreeable hours (the best time

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The aerial applicators go on the job with a semi-trailer load of spray chemical and Diesel oil. Roy Berry (above), of Springdale, Ark., uses Piper spray planes as well as surplus Navy jobs to do the work. They carry from 100 to 140 gallons of the chemical mixture which will weigh from 1,000 to about 1,500 lbs. A top-notch applicator can treat 200 acres in an hour. Notice in the lower photograph the characteristic spray "boil" as the plane flies in a power-stall, forcing the chemical down into the tree foliage.

Texas Nettie West

By R. J. McGinnis

"THAT SHOTGUN ain't loaded, but I can load her in a hurry." With one sweep of her hand, Nettie West grabbed a shell from a ledge beside the door, loaded and cocked the ancient weapon. She stood in the doorway of her shack, looking out over the sand and mesquite, a tense, spare figure in her print dress and threadbare sweater.

"I'm seventy-eight," she said, "but I can take care of myself." She smiled, a bleak smile that cracked the deep furrows in her weather-beaten face, but did not soften it. It was a smile of satisfaction, not of humor. There has been little humor in Nettie's life—seventy-eight years of mesquite, tumbleweeds and rattlesnakes in a two-room shack way back of beyond. No laughter, but Nettie can handle her problems. The oil people found that out when they came to deal with her. You can see it in the way she stands in the doorway with the shotgun, and in the firm, determined way she lifts the stove lid to spit.

Nettie West is pretty well known around her corner of Fisher County, Texas, the northeast part where cotton and range land merge, and where lately the mesquite and cactus have been flattened out by the big wheels of trucks hauling in machinery and hauling out oil. People say she is a shrewd woman, hard and tough, and not easy to know. She has outlasted two husbands, two bachelor brothers who lived with her, and all her family. Nettie has never had it easy—never had a chance, that is, to take it easy, until they brought in the best well in the Round Top field on her property. That was two years ago, and by then she was set in her ways, didn't know how to take it easy, and she doesn't aim to change, even though she expects to live to a hundred, maybe longer.

Nettie was born in Illinois in the prairie country where the blue stem and the buffalo grass tossed like the sea under the western winds. Her father pulled stakes when she was two years old and took his family, his wife, two sons and two daughters, to Texas. He took out a half section in Fisher county and built a two-room box house with lean-to. After her mother died Nettie was left with her two bachelor brothers and her husband, working the cotton and the cattle, on the half section.

Nettie made a field hand; she harnessed the team, took the sweeps and the ploughs to the fields, up and down the rows in the dust and the wind, working the cotton and the sorgo. She dragged in the dead mesquite, chopped it, stoked the stove, and cooked the salt pork and blackeyed peas and the lean steak from the range cattle. She fought a losing battle with the dust and blowing sand, but she learned not to be afraid of a rattlesnake—she broke their backs with a trace chain, clubbed them to death, blew off their heads with a shotgun blast. She learned to dip snuff, like most ranch women. "It cuts the dust," she explains.

The best years of Nettie's life were when her husband and two brothers were alive, working the ranch. She didn't have to go to the fields much—just the housework. Then in the Forties she had a spell of bad luck with her men. First it was her brother Jim. Jim came in from the fields one day, complaining that he felt bad. He hung his straw hat on the bed post and took off his boots, and died. That was in 1942.

The same year her husband, Charlie, took to bed. Said he just didn't feel well; nothing in particular, but weak and run down. "When he left, it was feet first," says Nettie. "He was a good man."

The next was brother John. John always wore a cap, one of those old-fashioned billed caps which he had brought from Illinois. He took off his clothes down to his long underwear, hung his cap on the bed post, and never got up. He, too, went out feet first and his cap hangs there today. Twelve years it has hung there, covered with dust, faded, the rust coming through the cloth covered button on top.

That left Nettie alone. She stood Charlie's 12 gauge shotgun and his rabbit rifle beside the door, put her best quilt on the bed where three of her men had died, and lived with their ghosts.

Then there was Johnny. Nettie had known Johnny most of her life. Johnny was 60, but looked younger, and he had a way. Nettie was almost 70. They were married in a church ceremony—a preacher and someone to stand up for both of them and a shower after. Next to the oil well that was the biggest event in Nettie's life.

Early in 1951 Johnny got to feeling bad. He unhitched the iron wheeled buckboard right by the door one evening, came in and went to bed and said he wanted a doctor. Nettie walked to a neighbor's place and called. Nettie thinks it might have been cancer. His buckboard is there, where he left it, rusting down, its sideboards scoured by the blowing sands.

Nettie wears two wedding rings, one on her index finger, the other on her ring finger. "I'll never marry again," she says. "Had two good men. The next one might turn out bad."

She settled down to live alone. She chopped her own wood, as she had always done, tended her few chickens, cooked her simple meals, kept the rattlesnakes out of her yard. Johnny had been a chain smoker—rolled his own out of Bull Durham. An expensive habit, Nettie thought, but she saved the bags, ripped them open, dyed them, and made a quilt of the pieces. She has a battery radio, always run down, but hasn't a telephone and takes no newspaper. She has three cats, but no dog. "Dogs keep you awake, yappin' at the varmints," she says. There's dust over everything, over the Elgin clock her father brought from Illinois, over the headboard of the bed, over Johnny's wedding suit, hanging on the wall beside the woodburner. There's tumbleweed piled fence high in the side yard, piled over the grindstone, over Johnny's wagon.

Nettie leased her land to a neighbor who put out a little cotton and sorgo and turned his cattle on the grass. She saved, and for safety, put her money in two banks, at Rotan and Hamlin. Sometimes on a Saturday a neighbor, J. A. Bates,

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Nettie West handles a gun like a man, for she has always lived among men. When she was young her father hired her out so that she could learn the ways of women. But it didn't work. She swings an axe like a man too, and at 78 she can make the chips fly. She drags in the dead mesquite, which grows by the door.

ONE BULL = 100,000

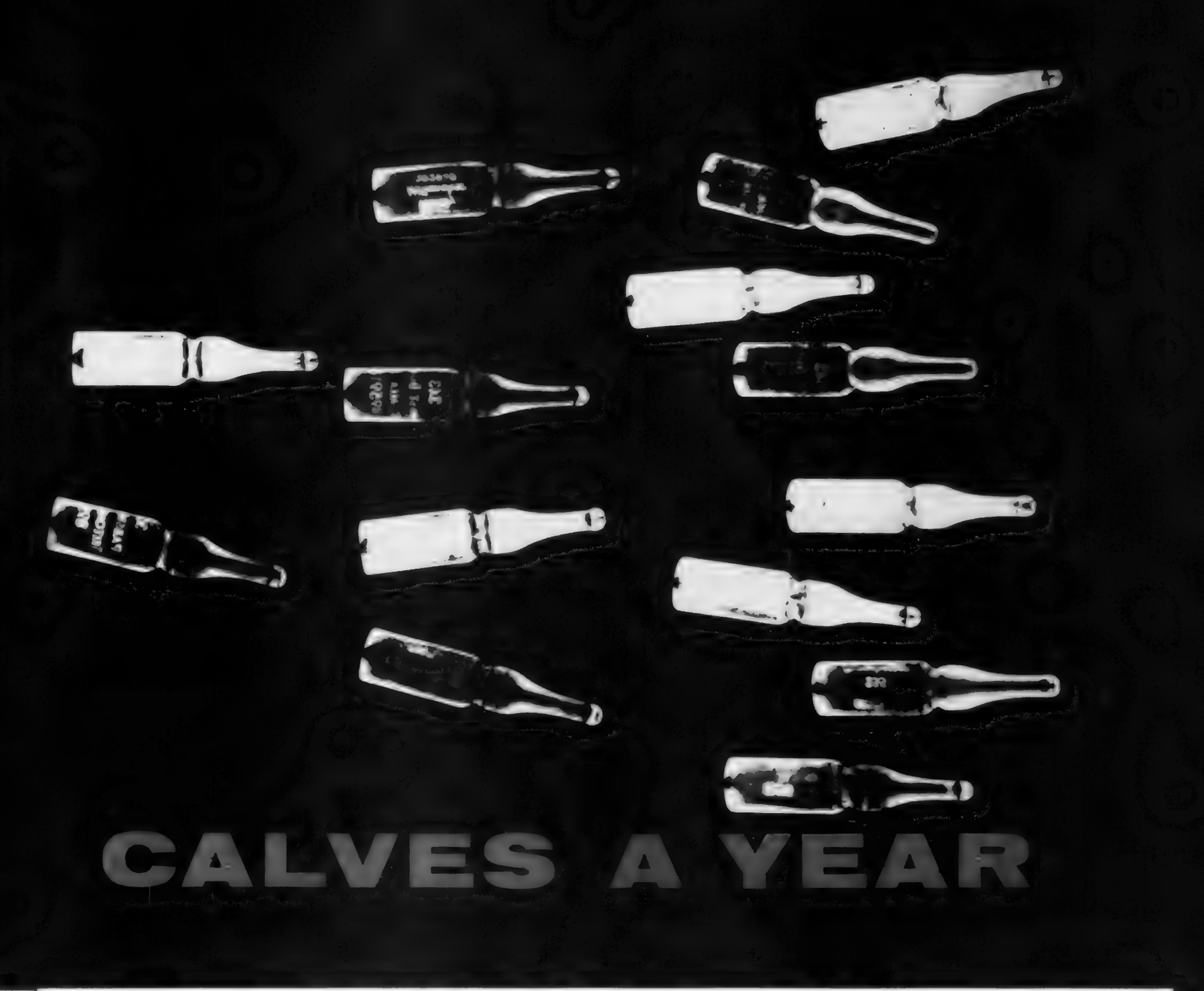
By Grant Cannon

SINCE HIS DEATH in November, 1953, Pabst Burke Tritomia Don has sired several hundred healthy, normal calves. He will be the father of a good many more before the last of his semen, which was frozen before his death and banked for future use, is gone. This Holstein bull, classified Excellent and given the rating of Gold Medal Sire on the basis of his daughters' performance, was one of the first to show the enormous value of frozen semen in carrying on the breeding work of a fine sire after his death. When they saw their bull failing, the Central Ohio Breeders Association, who owned him, banked around a thousand ampules of frozen semen for the future; when this is all used, he will have sired about twice as many calves since his death as most bulls get in a lifetime of natural service.

Three years ago when news of the first successful experiments in maintaining life in the semen after freezing came from Cambridge, England, it was predicted that such posthumous breeding might be possible some time in the future. The future is here, sooner than we thought.

This is the most spectacular development since artificial insemination was started. By freezing semen, the full potential of artificial insemination can now be offered to the farmer. A decade ago, artificial insemination made it possible for farmers to breed their cows to far better bulls than they could afford when they had to buy their own bull. But, the choice of which of these good bulls to use was left to chance. With the development of frozen semen, the farmer can breed to any bull in the stud for a fee of $5 to $10. He can plan a breeding program of inbreeding, line breeding, or outcrossing far in advance and be sure that the semen will be available. All that is required is that he let the inseminator technician know the bull he wants to use. As a matter of fact, it is now possible for any dairyman on any country road in the United States to breed his cow to any bull in the world. He may have a lot of arranging to do and his fee may run into the hundreds of dollars, but it is possible. Since it has become possible to plan breeding programs, a lot of good farmers have been reading Lush, Winters, and Gilmore, brushing up on their genetics and breeding systems.

The first efforts to freeze semen without destroying life in the sperm were reported in 1897 by C. B. Davenport, who froze human sperm with no more practical purpose in mind than to satisfy the insatiable curiosity of the scientist. He found that human sperm could survive freezing at 2 degrees Fahrenheit (all temperature readings in this article will be on the Fahrenheit scale). Very little more was done along this line until 1938. Then, between 1938 and 1952, scientists experimented with freezing human, frog, rat, goat, guinea pig, bull, rooster, and even moose



CALVES A YEAR

In one service, this bull produces enough semen to breed 1,000 cows after the semen has been extended by dilution and preserved by freezing. The calves from just one service equal the lifetime calf production of two bulls in the days before insemination. Used twice a week, this bull can produce semen for 100,000 ampules each year; one ampule services one cow.

sperm. They cooled the semen to temperatures ranging from just below freezing to 110 below zero, the temperature of dry-ice, down to 319 degrees below zero, the temperature of liquid nitrogen, and clear on down to minus 452 degrees, the temperature of liquid helium.

A group of English scientists were the ones who finally discovered the technique for freezing bull semen without destroying its fertility. These scientists, C. Polge, A. U. Smith, A. S. Parkes, L. E. A. Rowson, and D. L. Stewart, found that by diluting the semen with a 10 per cent solution of glycerol, the material could be safely frozen. It is still not finally determined whether the glycerol partially dehydrates the sperm and so prevents the formation of ice crystals which would puncture the cell walls or whether it changes the nature of the crystals which are formed and protects the cell in this way.

What is known is that semen which has been allowed to remain in a glycerol solution for 4 to 18 hours can be frozen and later thawed and used to inseminate cows. This is what the English scientists reported to the 1952 International Congress of Artificial Insemination in Copenhagen, Denmark. After the Congress, many of the men who attended took a side trip to Cambridge to see for themselves. One of these, Max Drake, the manager of the Northern Ohio Breeders Association, said, "When they thawed that little chunk of ice and I was able to see with my own eyes millions of living sperm thrashing around under the miscroscope, I was stunned. I knew that this was the beginning of a revolution in the whole field of artificial insemination."

The speed with which most of the bull studs in the country are being changed from a liquid, fresh semen operation to frozen semen has surprised even such men as Drake, who started planning the change-over the day he visited Cambridge. His own organization has been going through the pilot and testing stages and are changing from liquid semen to frozen as fast as they can train and equip technicians. Even so, they won't be the first to convert completely; Central Ohio Breeders Association will be completely on frozen semen by early fall.

How to Freeze Semen

As far as the bull is concerned there is no difference between the two processes. Semen collections are made the same way, using a cow that is perpetually in heat to excite the bull and collecting the semen in an artificial vagina. The change in processing begins at this point. The semen which is delivered to the laboratory is examined under the microscope to check the motility of the sperm and is then tested in a photoelectric device which measures the turbidity and translates this reading into the

A milliliter of diluted semen containing over 10 million sperm, enough for one insemination, is measured into each plastic storage vial.

The inseminator's breath causes a miniature cloud as he takes the vials of frozen semen out of the insulated carrying case in his car. The best method (below) of thawing out frozen semen is to hold it in ice water.

number of sperm. With these facts the laboratory technician can determine the rate at which the semen can be diluted and still deliver 10 million living sperm in each milliliter of thawed semen, the amount needed to service a cow.

The semen is processed for freezing as follows: First, a diluent made of egg yolk and sodium citrate is divided into two equal parts. To half of this is added an antibiotic to kill disease germs. Glycerol is added to the second half. Then the half of the diluent containing the antibiotic is mixed with the semen; this mixture is slowly cooled to 40 degrees, which usually takes from two to six hours. Then the second half of the diluent (containing glycerol) is added, a small amount at a time, over a period of several hours. This mixture is then allowed to stand for at least thirty minutes before freezing. During this period of glycerization, a change takes place in the sperm making it possible to freeze it without destroying its life. At the end of this time the diluted semen is poured into the glass ampules or plastic vials in which it is to be frozen. Each vial or ampule will hold one milliliter of diluted semen; one service of the bull, after dilution, fills from 400 to 1,000 ampules.

A story is told of the discovery of the need to allow several hours to pass between adding glycerol and freezing. The English scientists who discovered this technique had been trying to freeze semen with glycerol diluter for some time with no success. One evening, so the story goes, they had collected semen from the bull, diluted it with glycerol, and were about to freeze it when someone suggested dropping by the pub for a beer. While they were having their beer they remembered that the semen hadn't been frozen. They decided that it was too late to bother with it then and let it go. The next morning, before throwing it out, someone checked the semen under the microscope and found that the sperm were very lively. They decided to freeze it and were delighted to discover that they had found the key to their magic glycerol potion.

Adding the glycerol solution is the first critical operation in the freezing process. There are two critical periods in the actual freezing which come when water forms ice crystals and when the chemical salts form ice crystals. The solution to the crystallization problem is to drop the temperature past these danger points at great speed. The semen is cooled from 25 degrees to around five degrees below zero at the rate of four degrees a minute. At this point, powdered dry-ice is packed around the vials of semen in their alcohol bath. This smoking, bubbling sludge drops the temperature 8 to 10 degrees a minute until it reaches 110 degrees below zero. The fast freezing causes the liquids to vitrify rather than crystallize.

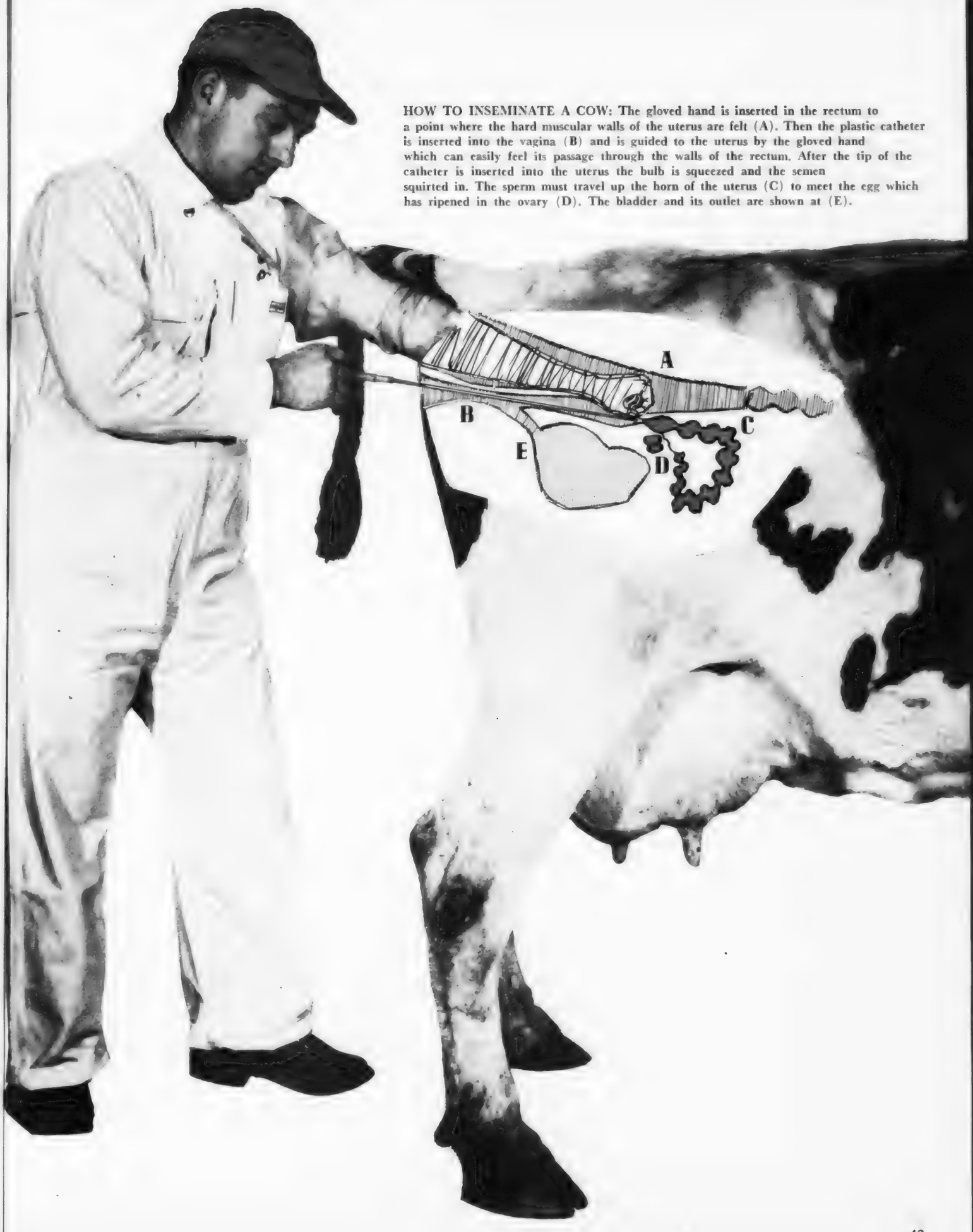
At 110 degrees below zero, which is so cold that an ampule of semen will burn the skin if it is held for long, the frozen semen is stored indefinitely. During the freezing and the first week of storage, there is a drop of 10 per cent of live sperm in the ampule; after that, the frozen semen seems to stabilize and there is no further kill of sperm.

The freezing of semen in this fashion works very well with most bulls. There are, however, occasional bulls who produce sperm which won't stand freezing. As yet, scientists do not know why this is, or what may be done to correct it. All that is known is that these bulls can only be used with the fresh semen method of artificial insemination.

Using Frozen Semen

Once the semen is cooled to 110 degrees below zero, it must be held at that temperature until used. Just what happens when semen is held at higher temperatures was shown by N. L. VanDemark, one of America's leading authorities in this field, who stored frozen semen at 110 degrees, 85, 60, 34, and 9 degrees below zero. At the end of the first day all the sperm in the semen stored at 9 and 34 degrees below zero were dead, as were a majority of those in the semen stored at 60 below. After five days, only three out of nine ampules of semen stored at 60 below zero showed any signs of life. Semen stored at minus 85 showed a slow but steady decline while that stored at 110 degrees below

(*Continued on page* **88**)



HOW TO INSEMINATE A COW: The gloved hand is inserted in the rectum to a point where the hard muscular walls of the uterus are felt (A). Then the plastic catheter is inserted into the vagina (B) and is guided to the uterus by the gloved hand which can easily feel its passage through the walls of the rectum. After the tip of the catheter is inserted into the uterus the bulb is squeezed and the semen squirted in. The sperm must travel up the horn of the uterus (C) to meet the egg which has ripened in the ovary (D). The bladder and its outlet are shown at (E).

Liquid Fertilizers

With the new equipment to handle liquid fertilizer, a farmer gets higher speed, lower costs and no lifting

By Chester Charles

IF COMPLETE liquid fertilizer is not yet available in your area, it soon will be. Last year liquid fertilizer was widely used in Indiana, Ohio and Illinois. With crop response as good as from dry materials, farmers have little sales resistance against the big appeal of liquid fertilizers: quick and easy application. The fertilizer is the same, made of familiar nutrients dissolved in water. Only the bag and the backache have been removed.

Some farmers are a little skeptical about liquid fertilizers. They rightly want to know why no national trade names are behind balanced grades. The answer involves some understanding of liquid fertilizer manufacture.

In the South and Midwest, liquid nitrogen, in the form of anhydrous ammonia or nitrogen solutions, caught on rapidly in the past few years. Farmers discovered that liquid nitrogen was cheap, went on easily, gave profitable results. In the West, liquid phosphoric acid gave similar advantages in irrigation. To the farmer who has found the advantages of covering a 20-acre field with liquid nitrogen in little more than an hour, a sack of dry fertilizer now feels heavier than ever.

Complete liquid fertilizers, containing nitrogen, phosphate, and potash in solution, got their real start last year. One hurdle lay ahead. Balanced liquids are about half water. Water is cheap, but hauling is not. As a way out, national raw materials producers offered their know-how to local industry. Once chemists had worked out the bugs in mixing, it was a simple matter for the dealers in nitrogen solutions, who have the necessary tanks and often the needed application equipment, to meet the farmers' demands for complete liquids. Only the raw materials are shipped. Local plants do the mixing and add the water, as a farming community enterprise.

Strictly Grass Roots

Plants are popping up all over. Small towns are the focal points of the new industry: Traverse City, Mich., Bern, Kans., Houma, La., Kitchel, Ind., Welcome, Minn., Napoleon, Ohio. Plants can be set up within 50 miles of each other without competing for the same farmer trade. Last year the Aylward Feed Company, Sullivan, Illinois, turned liquid manufacture into big business in one highly profitable season. This spring they built a new plant at El Paso, Illinois, 100 miles north. A Huntington, West Virginia, manufacturer, has already built two new plants this season and expects to have five more in operation in nearby states before the season ends. Wherever tried, liquid manufacture is proving a natural investment for the business-minded farmer. Feed mill owners, lime dealers, custom nitrogen operators, and large farm managers, whose greatest annual investment is usually in fertilizer anyway, are getting into the liquid fertilizer business. Mixing is rapid and can be done to order by merely turning the right valves, with finished storage kept to a minimum.

Mixed While You Wait

Making liquid fertilizer is not difficult. The trick is to make it cheaply as well as neutral—neither acid nor alkaline—so that it won't seriously corrode equipment. As every farmer knows, it takes very little moisture to cause rust and corrosion in dry fertilizer tools.

To maintain chemical balance, liquids require more costly raw materials than are used in solids manufacture. Quickly soluble and compatible forms of nitrogen and potash are required, often increasing costs. Superphosphate, the low-price source of phosphate in dry fertilizers, can-

not be used in liquids because it does not dissolve readily. Phosphoric acid is generally substituted, which means more expense and more corrosion in plant mixing tanks. Lime cannot be used as a neutralizer, as in dry fertilizers, for it will not stay in solution. Sources of nitrogen and potash are narrowed down by the need for offsetting the corrosive action of phosphoric acid. The method of manufacture likewise determines the choice of raw materials, which are separately available from producers in all sections of the country.

The simplest manufacturing process involves merely dissolving solid nutrient materials in desired proportions. Common nutrient sources are ammonium phosphate for both nitrogen and phosphate, urea for extra nitrogen and potassium chloride for potash. These chemicals can be purchased in bag or bulk. The only essential equipment is a steel or wooden tank with an agitator. Use of steam pipes in the tank hastens dissolving. A plant with one 4000 gallon mixing tank can make 20 tons of complete liquid fertilizer in 6 to 8 hours, or 80 tons a day by working round the clock in peak season. A plant of this type with storage for raw materials and some tank storage for finished products can be set up for less than $10,000. The disadvantage lies in the high raw materials cost.

Addition of a non-corrosive tank for mixing and a similar tank for raw liquid storage permit the use of liquid phosphoric acid. This raises the original investment but cuts phosphate costs by a third and quickens mixing since the phosphates are already dissolved. The introduction of pressure equipment for handling anhydrous ammonia, the cheapest source of nitrogen, turns such a plant into more than a $25,000 investment.

Wide Open Markets

Two kinds of sales organizations have entered the complete liquid field. The first are mostly small manufacturers and distributors who sell a variety of analyses in ton bulk lots for all farming purposes where dry fertilizer could be used. The second group, so-called "bottle men," sell one or two analyses nationally by the gallon or drum. These latter companies got their start in selling fertilizer for lawn and garden purposes. The past two years they have been promoting its use as an agricultural leaf spray, despite the contention of many research men that the amounts of liquids that can be applied without causing leaf injury are too small to increase yields.

Liquid manufacture has two limitations. As with table salt in water, only so much can be dissolved. Potash, of which only a small amount will dissolve in water, generally sets the upper limits of concentrations possible. Likewise, increasing the sum of nitrogen and phosphate raises the temperature at which the solution will salt out, or settle into crystals. Some producers make grades designed for cold

A liquid plow attachment seemed simple enough to make to C. V. Conder, near Lafayette, Indiana. So he made one. The tank has a gravity feed back to each of the bottoms of the plow, using plastic hose. A gate valve at the tank cuts off the flow for all three hoses.

(Opposite page) A conversion for putting down liquid fertilizer at corn planting time, made by Standard Steel of Indianapolis, Indiana. The kit makes use of any clean drums which the farmer has on hand. They can be easily and cheaply replaced.

This is a picture of a man loading fertilizer on a hot day in July. The pump is driven with a 1 hp gas engine and pumps the fertilizer from the hauling tank on the truck to the 275 gallon tank on the Hi-Clearance machine in about 20 minutes.

A truck-mounted 40-foot boom for high speed liquid fertilizer spreading. Here it is being used just before plowing.

A do-it-yourself rental applicator and five hundred gallon nurse tank being used in Indiana. Both tanks are aluminum.

Trailer-mounted equipment being used for early spring application of liquid fertilizer on fall sown small grain.

An inexpensive trailer-mounted unit, made by Continental Belton, working in 40-inch corn in Illinois. The farmer supplies his own steel drums.

weather use as well as grades specifically formulated for application in hot weather. Most N-P-K solutions now being made salt out at 32 degrees. They cannot be applied in freezing weather. As they warm up, the crystals go back in solution without loss in nutrients.

Richard Schaffer, Vincennes, Indiana, bulk liquid manufacturer, sees no problem in the fact that liquids cannot be made in high analyses. "We can't total more than 30 or 32 units of nutrients at a competitive price," he says. "So we can't formulate 0-20-20 economically, for that contains 40 units. Bottle men get up to 40 units, but their price is prohibitive to most farmers. High analysis dry goods is liked because it means less lifting. With liquids, it is simple enough to increase the rate of application, with no lifting at all. You are not paying for fillers, for the only filler used is cheap, ordinary water."

Flexible Formulas

With mixed liquids, endless nutrient combinations for prescription feeding are possible. Community mixing factories are exploiting tailor-made grades for local conditions. The Turner Seed Company of Villa Grove, Illinois, does not believe in selling a farmer more phosphate if his soil has already been highly rock-phosphated. For such purposes, they offer a 6-0-18 analysis or a 13-0-15, both unavailable in dry fertilizers. If a small amount of potash is desired as a starter in row planting, they recommend a 15-5-5 analysis, a 3-1-1 ratio not sold in dry form. Ed Crouse, Kitchel, Indiana, manufacturer says: "When you side-dress your corn, you may need both potash and nitrogen. With dry fertilizer you would have to apply each separately unless you used a complete dry fertilizer containing phosphate. The phosphate would do no immediate good for it is too slowly available. You'd want to use a formula like 10-0-10, which is impractical in solids. But we can make it."

Guaranteed Strength

Most manufacturers color their liquid fertilizers with varied dyes, not only for sales appeal but for easy recognition of the different grades in storage. They look toward the near future when farm storage will become popular, perhaps with price incentives for off-season purchase.

Bulk liquids are sold by the ton. Bottle goods are sold by the gallon. Whether purchased by weight or volume, state regulations require that the percentage of guaranteed nutrients be stated on tag or label in nutrient units per hundred pounds, as with dry fertilizers. Manufacturers' labels also show the weight per gallon so that the proper number of gallons may be applied in the field to result in the desired poundage rates per acre. Weights vary from 9 to 11 pounds per gallon, with 10 pounds per gallon considered average. Eight gallons equals the nutrients in an 80-pound bag of dry fertilizer of the same analysis, or 200 gallons equals a ton.

Retail Prices

The price of liquids depends on location. Shipping charges of raw materials effect retail cost levels. In most places, liquid or "wet goods" is underselling bagged fertilizers. One Illinois manufacturer sells liquid 10-10-10 locally at $63.90 a ton, including spreading charges—about the same price as bulk solids. The Liquilizer Company of Vincennes, Indiana, is able to ship drum lots on a competitive basis as far as New York for use as lawn sprays. The shipments are worked out with fuel oil companies with off-season empty trucks. Shrock Bros. Company of Bern, Kansas, meets dry fertilizer prices within a 200-mile area around their plant. Some analyses, because of peculiarities in liquid manufacture, are too expensive to market in competition with dry fertilizer.

Are liquids worth as much as solid balanced fertilizers? Grade for grade, liquids give results equal to dry products. Since plants can only utilize nutrients in solution form, liquid fertilizers sometimes give quicker response in dry weather and can possibly leach out a bit faster in very wet weather, but neither of these differences are considered significant by scientists. One soil specialist, Dr. R. H. Bray of the University of Illinois at Urbana, regards dry and liquid fertilizers of such equal value that "farmers should consider one main factor in purchasing any fertilizer—price of nutrients; not the purchase price, the price in the ground." Only by adding estimated application costs can the real cost of fertilizer where it is going to work be determined.

On-the-Farm Figures

One Illinois farmer who keeps records has this to say: "I used to cover four acres an hour with dry fertilizer. At a bare wage of 75 cents an hour, that's $3.00 for labor for a 16-acre field. Here's how I figure my costs on dry fertilizer:

16 Acre Field @ 250 Lbs. per Acre
Total = 2 Tons

Labor @ 75 cents per hour (4 acres per hour with a 9-foot dry spreader)	$ 3.00
Gas, maintenance and depreciation of equipment @ 80 cents per acre	12.80
Total for 2 tons	$15.80
Per ton	$ 7.90

"With a 40-foot boom on my applicator, I spray liquids four and a half times as fast as I can with a 9-foot spreader. That cuts gas, maintenance and depreciation from 80 cents an acre to 18 cents. Here's the way liquid fertilizer figures:

Labor @ 75 cents per hour (16 acres in one hour or less)	$ .75
Gas, etc., @ 18 cents per acre (80 cents divided by 4½ because I can spray 4½ times as fast)	2.88
Total for 2 tons	$3.63
Per ton	$1.81

A beautiful farm, a prosperous operation and sleek animals go hand in hand with farming know-how that supplies enough plant nutrients in the form of fertilizer, manure and organic matter on this Pennsylvania homestead.

"That's $6.09 a ton saving. Then if you add about $4.00 more, the usual bagging costs for dry fertilizer, liquids save not only time, but $10.09 a ton."

Give Us the Tools

Sales face one drawback—lack of equipment to apply liquids. To fill the need, a new type of farm business is shaping up. In a number of communities liquid fertilizer and equipment for applying it are being made under the same roof. Some sell applicator rigs at or near cost. Others loan out equipment or do custom spreading. The Gutwein Agricultural Service at Francesville, Indiana, rents a 100-gallon applicator rig along with a 500-gallon nurse tank for 50 cents per acre. Dick Cecil, Dayton, Ohio, manufacturer, has 300 rigs out with dealers, some of whom rent the outfits for a small charge, while others loan the rigs free with fertilizer sales. The Welcome Agricultural Chemical Company, Welcome, Minnesota, has 106 applicators to rent out. They serve a 100-mile radius from their plant by maintaining 6 central storage locations for outlying areas. Last year their rental equipment spread liquids on 75,000 acres. Phillip Woods, dealer at Chalmers, Indiana, loans out trailer-mounted 1000-gallon tanks for field use. For quantity users, he provides a low transport on which a farmer can take home 3 of the 1000-gallon trailer and tank units in one trip, hauling sufficient fertilizer to apply 300 pounds per acre to 100 acres. The Turner Seed Company, Villa Grove, Illinois, sprays for plow-down from a truck at $1 a ton, covering up to 100 acres in 8 hours. They can deliver a tailor-made analysis in eight hours after receiving the order. To encourage sales, E. E. Crouse of Kitchel, Indiana, converts four row corn planters to liquid application for $55. He also rents out a 300-gallon tank with pump and boom on it for 20-foot spraying. This unit sits on a farmer's pickup truck or jeep and rents at $1 per ton of fertilizer used.

A number of dealers offer a well-rounded service. Some employ full or part time agronomists. Some, like Red Senesac of Fowler, Indiana, maintain small soil testing laboratories. They map a farm, take soil samples, make fertilizer recommendations and outline a complete lime

(*Continued on page* 111)

With one hand on the clutch and a portable control in the other hand, the push button technique is applied to crib filling. The unloader pulls the corn off the wagon into the elevator which carries it into the round metal crib for safe, permanent storage. Round cribs are quickly and easily erected and provide storage at a low cost per bushel.

Cornhusking, 1870, by Eastman Johnson, Collection Syracuse Museum of Fine Arts

Low Cost Corn Cribs

THROUGHOUT all that vast expanse of land that lies roughly from southern Kansas to mid-Minnesota and from the Dakotas to the Ohio-Pennsylvania line, the most common of all farm fixtures is the corn crib. Frequently, it is the most dilapidated, too. No attempt has ever been made to glamorize this old work horse. The men who walked behind the plow that broke the plain, found that in the northern and more humid sections of that plain they could build cribs no more than 6 feet in width for safe corn storage. In the drier and warmer sections they could expand the width to 10 feet without danger. Those 6 to 10 foot dimensions became the foundation of the science of corn crib construction. And, unfortunately, for a long while they were almost the whole of the science—not that there is anything really complicated about the design and construction of a corn crib. To insure permanency, however, and to guarantee that the building will do an efficient job of holding the crop, that it can be loaded and unloaded easily, and can be built with a minimum of capital outlay, here are a few tips for the man planning a new crib.

Corn is always so high in moisture when it is picked that it must have ventilated storage. Every bushel put away at 20 per cent moisture must lose almost a gallon of water to hit a safe 13 per cent. Unless forced air is used or artificial heat is applied, the width is still the most important measurement in the crib, for the air must flow through the corn horizontally. If the crib is too wide, the free flow of air is blocked and the corn will spoil. For the same reason a single crib is better than a double crib. The single structure stands out by itself and gets the benefit of a free flow of air from all directions. So the first step in crib construction is to check with local builders or the extension agent to find the maximum width recommended for your area and be guided accordingly.

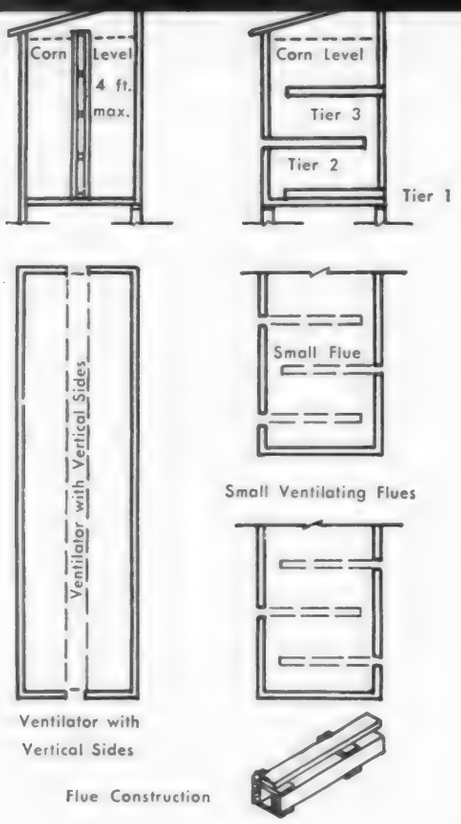
The 8-foot crib, details of which are shown on page 51, was built in an area where 6 feet is considered the maximum. The A-frame running the entire length of the structure gives it practically the same ventilating capacity as two 4-foot cribs, and at a greatly reduced cost.

Let's take a closer look at this particular crib. It is of a type that agricultural engineer Wendell Moore has been building in the eastern part of the corn belt on farms under the direction of the management firm with which he is connected. It is 8x60, 16 feet high in front, 14 in the rear. The length, of course, can be extended indefinitely, but this height is about the maximum for convenience in filling. A crib of this size has a capacity of 2600 bushels. This one was constructed recently for an even $2,000, about 77 cents per bushel of storage space, including the concrete floor.

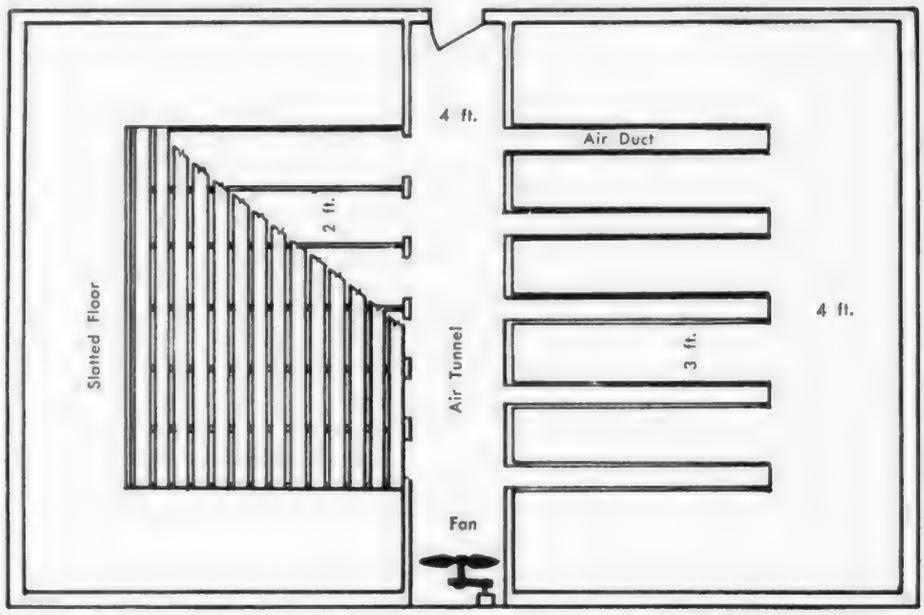
Moore likes to use rough lumber in his cribs. It not only costs less, he says, but adds strength. A concrete floor is not strictly a necessity, but it is certainly high on the priority list. It will add years of life to the building and act as a deterrent to rats.

The crib sits on footings sunk 2 feet in the ground and 12 inches wide. Two rows of concrete block are laid on top of the footings, the space between is filled with gravel and the concrete is poured over the gravel fill. The location of the A-frame eliminates the possibility of a shelling trench for emptying this crib. Building it on two layers of block, though, permits laying a drag beneath the scoop doors on either side so most of the corn can be emptied without any shoveling.

Almost all the structural timbers are 2x6's. Exceptions are the 2x8 ties placed across the center of the building every 6 feet to hold the opposite walls together, and 4x4 double walers running along both sides. The walers are tied together every 6 feet with a ⅝-inch rod. The outward pressure of the corn as it settles becomes very great. The purpose of the 2x8 ties



If the corn is too high in moisture or the crib is too wide, a vertical ventilator can be fitted down the center or horizontal flues can be staggered through the corn (left). The diagram below shows the suggested layout for either a slatted floor or air ducts for forced air ventilation in a wide crib.



and the rod joining the walers is to keep the two sides of the crib from taking off in opposite directions when the big push is on. The ends of the structure are tied together by a half-inch rod running the entire length of the crib through the upper end of the A-frame.

The uprights of the A-frame are 2x4's 8 feet long and 2 feet on center; 1x4's are nailed horizontally along the uprights at top, center and bottom as shown in the diagram and the rest of the frame is covered with wire fabric. A batten and hinge is provided on one side of the A-frame at the bottom for cleaning out whatever shucks and shelled corn happen to fall into it.

Welded iron fabric 1 by 2 inches is used for cribbing and is reinforced by 1x4 horizontal strips as indicated in the drawing. Hardware cloth is also used around the lower section for rat protection. Scoop doors 2 feet 10 inches square are placed at 9 or 10 foot intervals along the bottom of the crib. At the builder's discretion several of these openings can be extended to a height of 5 feet 10 inches to provide man doors.

The roof has hatches 2 feet by 4 feet for filling. And filling, it should not be forgotten, is one of the hazards of corn storage. If the corn is allowed to fall directly under the elevator spout, shucks and shelled corn will tend to pile up in such density as to seriously hamper the free flow of air and spoilage will result. A deflector of sheet metal under the spout is a big help in scattering the incoming material.

Moore points out that plenty of hatches are the secret to ease of filling a crib of this type. With a flat or single pitch roof it is hard for a man to get inside and level off the corn so the more openings there are the easier it is to handle the distribution and use every inch of storage space.

This type of construction adapts well to the double crib, too. One was built on the Kroger Farm at South Charleston, Ohio, recently, for about $4,300. This one consisted of two cribs, each 7x48x16 with a 15-foot alley between. It has a capacity of 3800 bushels and the price included the cost of painting and installing gutters.

In the event a man finds himself with a crib on his hands which a former owner may have built too wide for the area, he can use the small ventilating flues shown in the diagram to increase the flow of air through the corn. These are simply parallel pieces of 2x4's or 2x6's one foot shorter than the width of the crib, nailed together with 7½-inch strips of 1x4 every 1½ feet on center. The top board is also a 1x4 strip, or the top can be covered with hardware cloth. These ducts are staggered through the crib, as illustrated, every 4 feet. The first tier is laid on the floor. After a layer of about 4 feet of corn has been filled in, the next tier is laid, and so on. Only one end of the flue is attached to the side of the crib.

Round Cribs

This kind of flue is also handy for stepping up the ventilation in round cribs. The general rule on the size of round cribs is that their diameter should never be more than one and a half times the maximum safe width of a rectangular crib. In other words, in an area where 8 feet is the maximum width for a rectangular crib, 12 feet is the upper limit on the diameter of a round crib.

While there is a definite limit to its capacity—it cannot be built indefinitely skyward as a rectangular model can be stretched out to the end of the county—the round crib is a handy and quickly erected storage building. One of the big weaknesses of this model has always been the roof. That big, round metal canopy has always had a fatal attraction for the wind. Manufacturers, however, have overcome most of the bugs in this department and have come up with anchoring devices which will defy the huffing and puffing of the wildest March roof-raisers. Built on a solid concrete foundation, a round crib can be a permanent and efficient structure on any farmstead.

As to cost—one Illinois manufacturer of an all-steel job sells a 700-bushel crib f.o.b. the factory for $325; a 900-bushel model for $425. To these prices, of course, must be added shipping charges and erection costs.

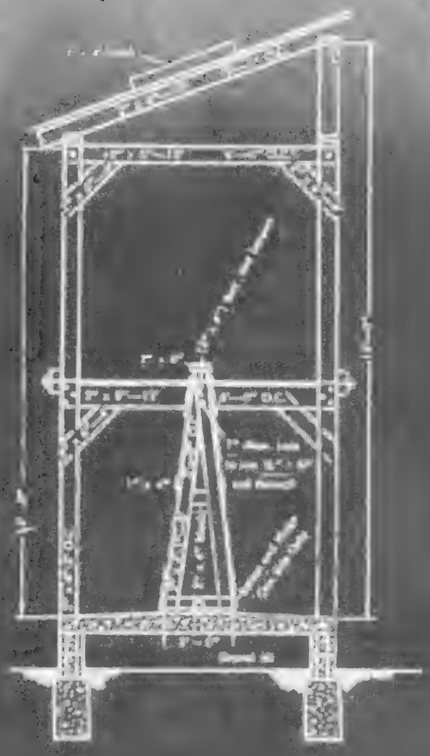
Pole Construction

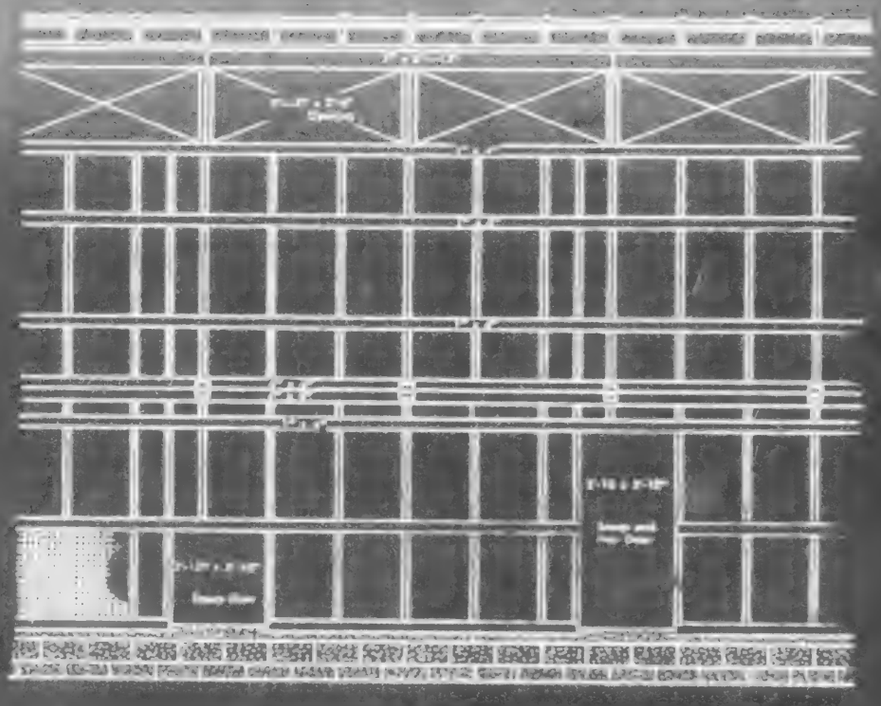
The prospective builder who is sold on pole-type construction will find a lot to interest him in a design like the Reynolds pole crib. This plan ties two 8-foot cribs together with a 12-foot alley. The cribs are 32 feet long, 11 feet high to the eaves, and are filled through center roof hatches. The entire structure is built on pressure-treated posts set 4 feet in the ground. Four-foot picket fencing is used for the cribbing and the roof and gable ends are of corrugated, embossed aluminum sheets. This crib is designed with a plank floor. Complete plans can be obtained from the Reynolds Farm Institute, Louisville, Kentucky.

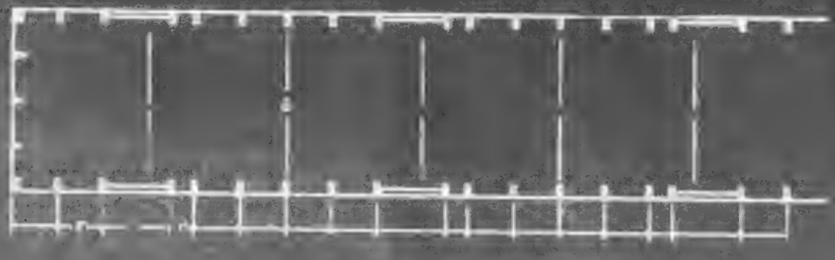
The factor that gives this type of crib its durability is the use of pressure treated lumber in all members which come in contact with the ground. Termites and rot are notorious in their destruction of frame buildings but the use of Penta treated

(*Continued on page* 109)

A long crib can stretch from here to eternity. The only limit is the line fence. Construction details on a similar low cost long crib are shown below. Rough cut lumber is used, all of it 2"x6" with the exception of the cross ties, which are 2"x8", and the walers, which are 4"x4". This crib is 8 feet wide but the A-frame down the center gives it the same ventilation capacity as two 4-foot cribs. It is filled through 2'x4' roof hatches and it sits on two layers of concrete block so a drag may be laid beneath the scoop doors for ease in emptying.







Welded iron fabric is used for cribbing and is reinforced by 1"x4" strips. The bottom drawing shows the placement of the scoop doors and the details of the framing and ties.

HIGH OR LOW PRESSURE...

FARMERS who are in the market for an irrigation system may have a choice of either high or low pressure layouts. Some are limited to low pressure by the soil they farm. Though both systems use a similar design, the high pressure system uses giant sized sprinklers which cover an acre or more at a setting and their laterals are spaced two to ten times as far apart as low-pressure laterals.

There is no sharp line between high pressure and low pressure. High pressure has come to mean a system which operates at from 80 to 100 pound pressure and uses the giant sprinklers. Low pressure takes in all the rest, from those which operate at five pounds to those just under the giant size. Even though a farmer may not be able to use the biggest sprinklers, which pour down one-half inch to an inch of water an hour, he does have a choice in the intermediate pressure group. Along with the farmer who owns land which can absorb the water a high pressure system throws out, he wants to know, "Is high pressure irrigation worthwhile?"

"If I had to use a low pressure system, I'd give up irrigating," William Lesher, a 25 year old Ohioan who irrigates 200 acres of corn on his 775 acres of owned and rented land, said when reviewing his farm operation the other day. "I just don't have the time to fuss around changing pipe lines every two or three hours. A low pressure system would be all right, I guess, for high value truck crops, but I doubt if I could use it on corn with my set-up."

This young-man-in-a-hurry farms on the banks of the Miami River in Miami County. There is plenty of water everywhere on the farm, either from the river or from the water-filled gravels beneath

Pump, pipe, and sprinklers (top) of a high pressure system pour over an inch an hour on two acres of pasture. For soils which can't take this much water, a reduction in overlap is recommended. The giant nozzle shown below uses three outlets to cover short, middle, and far distances; the nozzles in the photographs at the top of the page get coverage by shooting fore and aft. Many soils can't absorb the downpour high pressure delivers. To use high pressure on them would be both wasteful and damaging.

Water Holding Capacities of Soil and Application Rates

SOIL Average Conditions	Available Moisture	APPLICATION RATE*		
		Slope 0-5%	Slope 5-10%	Slope 10%+
	Inches Per Foot	Inches Per Hour	Inches Per Hour	Inches Per Hour
Coarse textured sands, fine sands and loamy sands	0.5-1.0	1.5-2.0	1.0-1.5	0.5-0.7
Moderately coarse textured sandy loams and fine sand loams	1.0-1.5	0.7-1.5	0.5-1.0	0.3-0.5
Medium textured very fine sandy loam, sandy clay loams and silt loams	1.5-2.5	0.3-0.7	0.2-0.5	0.15-0.3
Moderately fine textured clay loams and silty clay loams	1.5-2.5	0.2-0.4	0.15-0.25	0.1-0.15
Fine textured sandy clays, silty clay and clay	1.5-2.5	0.1-0.2	0.05-0.15	0.05-0.1

*Application rates for poor vegetative cover. Rates may be increased about 25% when sprinkling crops that provide good ground cover.

which should I use?

his fields. Two of his pumping stations are on the level of the river and two others on the banks of what he calls a pond, but which is really a giant well 80 feet in diameter and 30 feet deep which fills from underground water to within four feet of the top. He has plenty of water everywhere, even during the driest summer, except, of course, in the root zone of the growing corn. Here, the sandy loam gives up its water rapidly, leaving the corn as close and yet as far from water as the Ancient Mariner.

The equipment he uses to water his thirsty crop consists of a pump powered by a 110 horsepower Diesel engine, 2400 feet of six-inch aluminum pipe, 600 feet of five-inch aluminum pipe, and three giant sprinklers. With this equipment he can sprinkle two inches of water over his 200 acres of corn every two weeks.

Bill Lesher, endowed with a talent for mechanics, has mechanized his irrigation chores. During the season he irrigates 10 hours a day, moving sprinklers during the day and moving pipe in the morning before he starts the pump. The pipe moving job is the only one which requires an extra hand. His 14-year-old nephew, or occasionally his wife or father, drive the tractor which pulls his special pipe wagon. This is a low wagon with an elongated wheel base (15 feet) and a lengthened tongue which he converted for this job.

Lesher solves the difficult problem of handling 30-foot lengths of six-inch pipe in tall corn by leaving out two row watering alleys every 60 rows down the field. This gives him space to drive in with tractor and wagon and move the pipe with a minimum of muscle power. After each set, he loads the pipe on the wagon and totes it down the field to the next watering alley. Here he unloads and assembles the pipe-line. The sprinklers are separate units. These are mounted on five foot risers in order to shoot the water over the top of the corn. The sprinkler-riser assembly is mounted on wheels for mobility and stability.

There are fifteen valve-controlled outlets for the sprinklers along the main pipe line. The first sprinkler is attached to the outlet nearest the pump, the second is at the tenth outlet and the third at the last outlet on the pipe. During the day, the first sprinkler is moved down the pipe toward the center: the other two are moved up the pipe toward the pump.

From the time he starts moving pipe until he presses the starter button on the big Diesel, Lesher has spent an hour. He watches the operation for a moment to make sure the pressure is up to 100 pounds and to check the safety device which will cut off the engine if it starts running hot or if the oil pressure drops or if the water pressure in the irrigation system drops. Then he goes on with his other work.

The giant sprinklers slowly revolve, throwing out an inch-thick stream in a high arc where it breaks up and falls on the crop as gently as rain and at the rate of an inch an hour. Every two hours, Lesher makes a quick trip back to the system to move the sprinklers. He waits until the main stream of water has swept slowly past him, then he darts in and turns off the water without getting wet. He has rigged up a small, one-cylinder tractor which carries him over the wet ground to the sprinkler without even getting his feet wet. He turns off the valve at the outlet, detaches the sprinkler, and tows it on to its next station. Moving the three sprinklers takes him fifteen minutes. At the end of 10 hours, he has watered 15 acres: the pump is shut down and the pipe allowed to stand where it is until morning, when the ground is firm and the pipe can be moved without bogging down.

Lesher, who raises no livestock and uses corn as a cash grain crop, feels that his method of leaving out two rows every 60 rows for space to lay the pipe is best for his type farming. In Indiana, Lon Gleason, who raises hogs, sheep, poultry, and cattle, and needs lots of hay, has worked out a variation. Since he irrigates both a hay crop and corn, he has figured out a way to do both and take advantage of mechanized pipe moving.

Gleason's solution is to plant his corn and hay crop in alternating strips 200 feet wide and a half mile long. With this layout, he can lay his pipe on the edge of the hay strip and with the giant sprinkler throw out a rain that more than covers half the corn and half the legume strip. The advantage of this system is that the pipe is out in the open where it can easily be reached with a wagon for loading the pipe at the end of the run. After covering one-half the strip, the pipe is moved to the other side of the legume strip, finishes the legume and irrigates half the next corn strip.

(*Continued on page* 114)

The Master's Touch

A veteran shepherd and a skilled craftsman tells how to care for the flock and raise fine lambs

By Charles R. Koch

"YES, SIR, that's right, I shear the ewes twice a year, in May and again in August. I know I'm not going to get much for me wool in August, but it's worth the effort the way shearing gets the ewes to settle." Those are the words of Harold Barber, the gnomelike English shepherd and head herdsman at the University of Kentucky Experiment Station. For more than thirty years, Barber has been showing Kentucky farmers how to take the guesswork out of the sheep business. His accent still smacks of his native English countryside, but his advice on sheep is distinctly for the sheep grower, wherever he may be.

His opinion on the value of shearing ewes twice a year came in answer to a question from a young central Kentucky farmer, Bob Stanley. Stanley had been "foolin' around with sheep," as he put it, most of his life. His father always had a flock on the homeplace. Just took them more or less for granted. They kept the place cleaned up, supplied a little income from wool and lambs, and that was it.

This spring Bob got to thinking about those sheep. He felt he should have saved a few more lambs than he did, he had too many barren ewes nibbling off the best rye pasture and giving nothing but a little wool in return. And there should be some way to bunch that lamb crop. The first lamb of his crop gave a bleat of welcome to the New Year and it was almost May before the last of the stragglers came along. He'd made up his mind to get the answer to bunching his lambs in '56. It would probably take him no more time, and cost him very little more. He drove over to the experiment station to get what advice he could.

Kentuckians are lucky that way. All they have to do is drop over to Lexington and they can talk over their sheep problems with two of the country's top experts on farm flocks—Barber, the little Englishman, and Richard Miller.

Miller took a trip to Australia and New Zealand a good many years back, saw the famous Canterbury lambs, and came back to Kentucky with The Idea that sparked the phenomenally successful Kentucky spring lamb program. As field agent of UK's Animal Husbandry Department he promoted this program over the state.

Working with Miller is Barber, whom associates and competitors alike refer to as the world's greatest shepherd. Bob Stanley came here for advice. Now he is getting it straight from the shoulder.

"'Ow did we get on this business of shearing so soon?" Barber asks, "Let's go

back and start at the beginning. You want to know 'ow to do a better job with your flock. Let me tell you just like I'd tell one of me boys here.

"You have sheep, so I don't have to tell you what to start with. To keep things straight, when you're just getting into it, work with not more than twenty-five or fifty ewes, a one or two ram flock. Use purebred rams on crossbred Western ewes. For a commercial flock there's no point in using native ewes or in trying to save your ewe lambs for replacements."

"How do you select your ewes?" is Stanley's first question. Barber is ready with the answer. "Meself, I like the dark faced, speckled faced, or grey faced ewe. They are good mothers, good milkers, very prolific and good shearers. Most of them are a Rambouillet-Hampshire cross. You'll get a lot of three-eights wool off them.

"I don't want a ewe that is stringy and shallow bodied, but I don't want her too short coupled either. She has to have room to carry a pair of twins. She must have good length from shoulder to flank. And I don't want her wooled up in the head. A ewe with a clean face is a much better suckler than a ewe that's heavy wooled in the head. That's been my experience both with grades and purebreds."

Stanley was skeptical about how a wooled up head could affect a ewe's milk supply, and he said so. Barber was quick with his answer. "I know every ewe in my flock like one of my family. I know every good suckler and I know every bad suckler and most all my bad sucklers are ewes that are heavy wooled in the head. 'Ow do I know? I can look at a lamb and see that bloom on him, that's 'ow I know.

"A ewe's leg must set well outside her, too, and she must be up on her pasterns so she can get around. Frank Goff, one of the best horse judges over in the old country, once told me, ''Arold, if you ever judge 'orses, let 'em walk. If they can walk good they can do something else.' That's the way it is with sheep, too."

Picking the Ram

As Barber stops to light the stump of his cigar, Stanley asks, "What about the ram?"

"Purebred," replies Barber. He says that he has a personal preference for Southdowns and Hampshires. He likes the Southdown because it will get a quality lamb and the ewes have less trouble in lambing. He likes to use them on ewes that are having their first lambs, recommends using Hampshires later. The Hamps, in his opinion, get bigger, faster gaining lambs that will hit the market a month to five weeks earlier. This cross, he explains, will have less quality, however, and the lambs won't hold their condition in the hot weather like the Southdown cross lambs. Because of this, he creep feeds his Hampshire-sired lambs all the way through while he creep feeds his Southdown cross early and depends on

"I like the kind of lambs that grow sideways," says Harold Barber (above), holder of the unofficial title of World's Greatest Shepherd. Roomy quarters (left) with wide gates and doors and feed racks that can't be jumped are essential in protecting heavy ewes from injury by crowding and bumping. "What you're reading in that book," he tells one of his student assistants (right) at the University of Kentucky, "is only the beginning. If you want to make a good shepherd you've got to live with sheep."

Lambs are branded with a lanolin paint which washes out of the sheared wool.

pasture later. It is this kind of detail in raising stock that sets a man apart.

In selecting bucks, just as in picking his ewes, he puts a lot of emphasis on how they walk. "I want to see him stay together when he walks," is the way he puts it. "I don't want to see his shoulder blades working up and down. While I want length in the ewes, I want my rams short coupled. The packer buyer doesn't want a stringy lamb. He wants one that's coupled up. Jonas Weil, he was a packer buyer and a good one, said to me once, ''Arold, I like these lambs that grow sideways.' That's just the kind you want, the kind that fill out fast. When you're using long-bodied ewes it takes a short coupled ram to make that kind.

"Then I want a ram that will handle, one that touches well. If I go to buy a ram from a man who has twenty-five or thirty for sale, I'll ask him, 'Have these rams all been raised the same? Have they all been fed the same?' Then I can close me eyes and touch those rams on the back and tell which one I want. I like that old rubbery touch. It's like when you put your hand on a basketball that isn't fully blown up. It'll spring right back at you.

"A ram should be short legged and his legs should set well outside him. He should be deep in his twist and thick in the leg. That's where your high priced cuts are. And I want a short necked ram. I don't like a necky sheep and the packer buyer don't like a necky lamb. Who buys neck meat?"

The Barber standard calls for a small head not wooled too heavily. His argument here is that the packer buyer cuts the head off and throws it away; also, the ewe has an easier time lambing a lamb with a small head. He is careful to point out that this is in regard to the ram selected for the commercial flock. For a purebred flock he favors the buck with a lot of strength and character in his head.

And he wants all these qualities wrapped up and put together in a ram with plenty of life about him. "I don't want no dead 'ead," he says. "I like the kind that when you go to ketch him here, he's over there, and when you go to ketch him there, he's here. They're fertile."

The Breeding Season

"I have too many barren ewes," Stanley says. "How can I get them to settle together?"

With a lift of his eyebrows, the grizzled little shepherd slips into a philosophical mood. "It's a funny thing about lambing down a bunch of ewes," he says. "I've been taking care of sheep since I was a kid in me teens. Give a bunch of ewes the same feed and the same treatment year after year and one year you'll have good luck and one year you'll have poor luck. Comparatively speaking, of course. A good shepherd is never going to have as much trouble.

"Take now last year. I had more ewes settle to the rams than ever before. I only had four barren ewes. This year I had practically the same bunch of ewes—ninety-two of 'em—and the same rams bred some of these ewes five times before they settled. I think the reason is, I didn't shear me ewes in August last season and the season before I did.

"I'd always advise a man to shear his ewes before he turns the bucks in. It's a big help in bunching up the lambing season.

"When to start breeding depends on whether a man can handle early lambs. Myself, I like to get my lambs in January and February so I can get them on the market before hot weather. In Indiana and Ohio I notice they get a lot of lambs in April. But I like 'em early. And most farmers down here can handle them early. They have tobacco barns with a stripping room where they can have a fire and hot water. Pick your lambing date, count backwards five months and that's when to start breeding."

"Is there anything else a man can do to bunch up?" Stanley asks, remembering the spread between his first and last lambs.

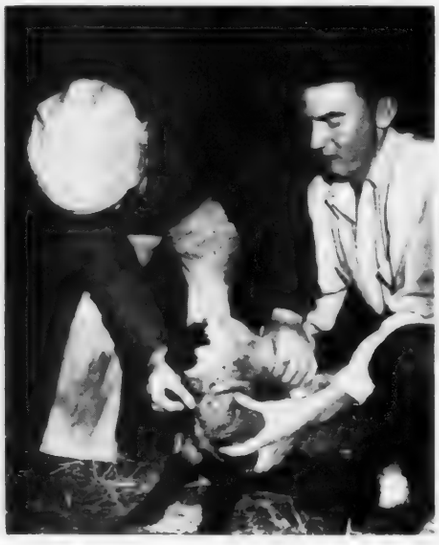
"Flushing the ewes will help to bring them all in heat in a short period," Barber answers. "Fresh, lush pasture about two weeks before breeding is fine for flushing ewes. We like bluegrass, but if you don't have it feed some grain, or plant rape and oats in May—nine pounds of rape and a

(*Continued on page* 78)

How To Make A Ewe Own An Orphan Lamb

Ewes are stubborn about nursing any but their own lambs. This is how to make an orphan acceptable to the mother of a dead lamb.

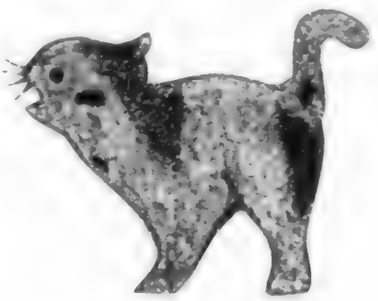
Barber skins the dead one and slips the hide over the orphan, attaching it by bands of skin at the neck and ankles.

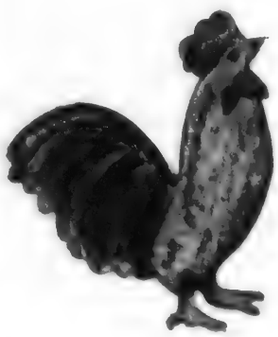


Fooled by the hide of Esau, the ewe without hesitation turns over her own lamb's birthright to the orphan.

Only a gentle and unselfish man can be a good shepherd; he must be the kind of a man the smallest lamb can trust.

Round-up by Tommy Largy, 8, Albright Art School, Buffalo, New York; Robert C. Smith, teacher.





Rooster and Kitten by Wilma Jean Laxton, 10, Guilford School, Cincinnati, Ohio; Walter Johnson, teacher.

Big Bird by Tim Brand, 7, Albright Art School, Buffalo, New York; Robert C. Smith, teacher.

THROUGH CHILDREN'S EYES

When I returned to my uncle's house, which I had not seen since the days when I visited there so often as a child, I found that, incredibly, the house, the trees, even the giant barn had shrunk. "But it is a little house!" I said to my brother, and I had to stoop to go through the kitchen door. And it was true; it was not the house I had seen as a child, for I had seen it then through a child's eyes. And I must admit to a great longing to see it so again.

This was a letter written us by a friend during a visit to his old home in Europe. We felt that his experience was one that many would recognize and we decided to set about finding out as nearly as possible just what today's farm world looks like to a child. We cannot, of course, see the farm as they do, but we are but one step removed when we see the pictures they draw of what they see.

We asked farm children in the third and fourth grades—children untouched by the formalism that maturity imposes—to draw pictures of the things they see on the farm. And we asked city children of the same age to draw us farm scenes as they imagined them or as they may have seen them in books or on a visit.

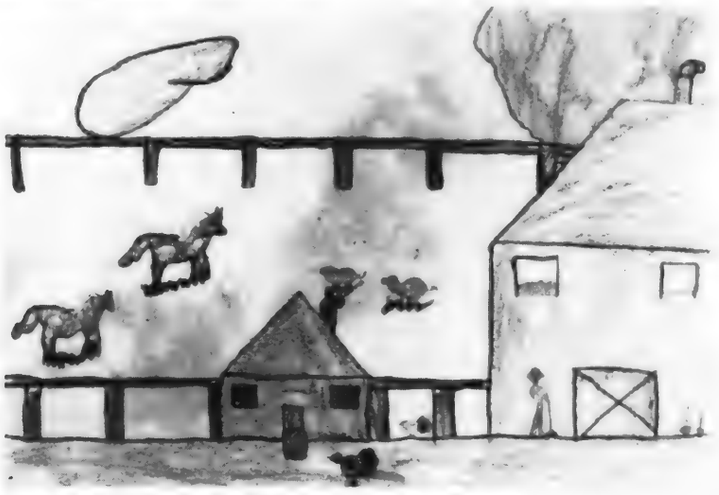
Here are the children's pictures. They are not great art, but they capture a quality which we have not seen since we, ourselves, were very young. An expert can tell which of these drawings was made on the farm, which were imagined, and which were impressions copied from pictures. Can you?

Dog on Disk by Douglas Blincow, 3rd grade, Green Valley School, Danville, California; John Muir, teacher.

Happy Cow by Jackie Jewell, 8, McGuffey School, Oxford, Ohio; Mrs. Harry Richardson, teacher.

Windmill by Ernest Neal, 11, Guilford School, Cincinnati, Ohio; Walter Johnson, teacher.

One Fine Tree by Robert Jewett, 9, Worcester Art Museum, Worcester, Massachusetts.

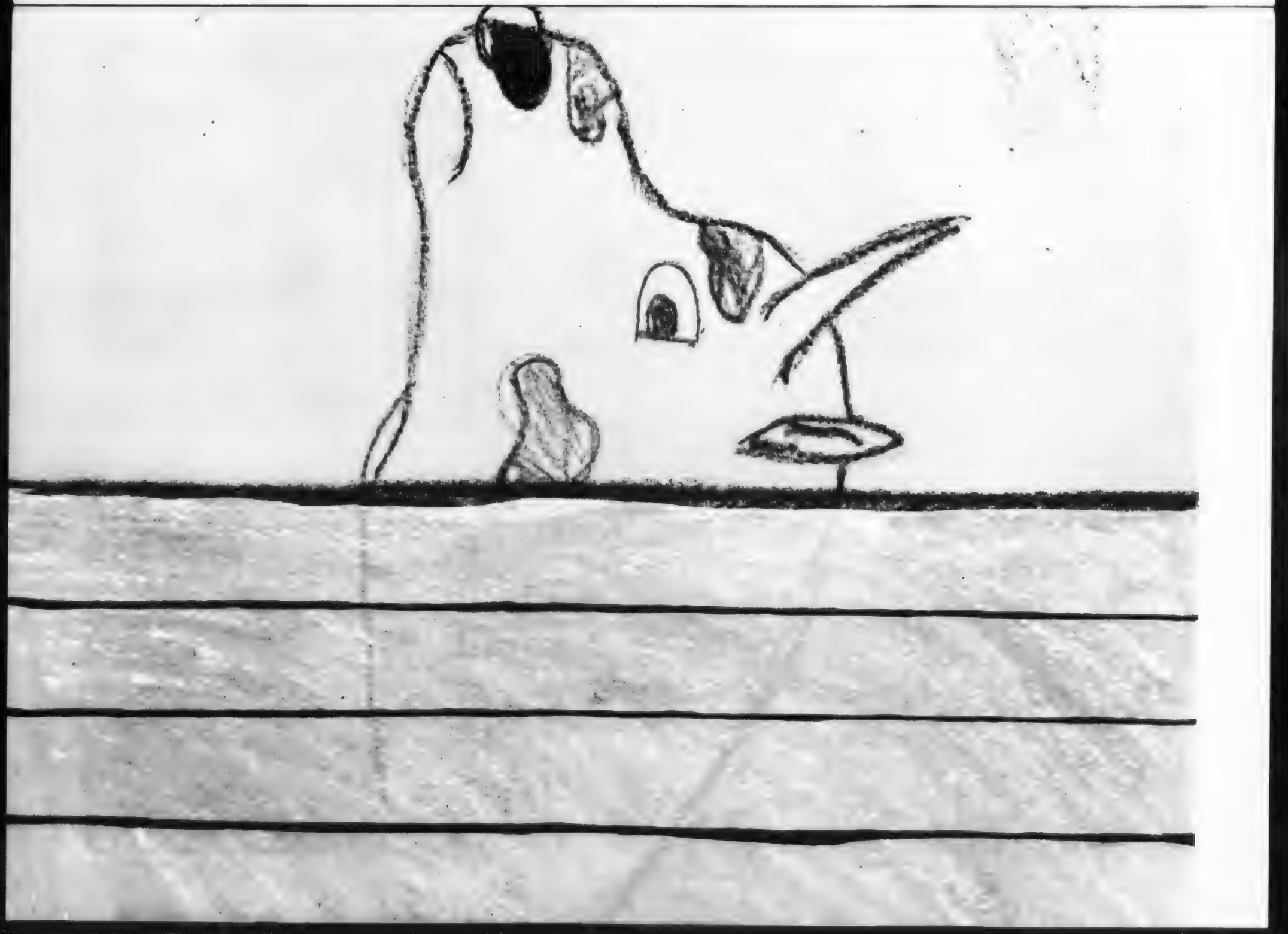


The Farm Yard by Hazel Ehler, 8, Ross School, Hamilton, Ohio; Floris Evans, teacher.

Halloween by Dick Marteeny, 5th grade, Highland Park, Illinois; Marguerite Pearce, Art teacher; from *School Arts Magazine.*

Bo Peep by Jane Ann Cannon, 7, Newtown School, Newtown, Ohio; Mildred Jerden, teacher.

Our Bull by Patty Barnhart, 8, McGuffey School, Oxford, Ohio; Mrs. Harry Richardson, teacher.



Raise your own Herd REPLACEMENTS

THE BETTER the job a dairyman does the less he can afford to buy herd replacements. When he gets up into the stratosphere of 14 to 16 thousand pound cows with upwards of 450 pounds of butterfat, he finds it almost impossible to buy the kind of replacements he needs. The hard fact that his income is primarily from his milk sales also means that he must be a miser when it comes to using part of his cash crop of milk for raising heifers. So what's a man to do?

Milk replacers may be one of the answers. Man is eternally tinkering around with ideas for improving on nature and one of the biggest challenges to his ingenuity has been to develop a substitute for "nature's most perfect food." So far, he hasn't quite hit the bull's eye, though he has come mighty close to it. By concocting mixtures based on animal proteins like dried buttermilk, dried skimmilk, or dried whey, or on vegetable proteins like soybean oil meal, or even the highly digestible blood meal or blood flour, and fortifying these products with minerals, vitamins and antibiotics, he has come up with a feed that even the most discriminating calf has a hard time telling from mother's own.

In selecting a milk replacer a dairyman should be aware of the basic requirements of a good calf food. According to the nutritionists these are five:

(1) It must have plenty of protein, somewhere around 20 per cent. Calves need fuel to feed the rapid growth of their own protein tissues.

(2) The protein must be of good quality. There are proteins and there are proteins. Some proteins just don't have all the necessary amino acids. These are proteins of low quality. Whole milk is absolutely tops in protein quality and any substitutes for it must furnish similar quality. The ingredients already mentioned as the foundations of most milk replacers all supply protein of good quality.

(3) Obviously, the replacer must supply enough total digestible nutrients to permit normal growth.

(4) Either the replacer must provide minerals, or they must be fed as a supplement. Most important are calcium, phosphorus, and salt.

(5) Generous amounts of vitamins A and D are important. The vitamin D requirements of the calf are one of the reasons for getting it onto hay as quickly as possible. Leafy legume hay will supply adequate levels of this vitamin: its absence makes it necessary to supplement the milk replacer.

Practically all the commercial milk replacers offered to the farmer today fulfill these basic requirements. Most of them are also supplemented with antibiotics to help combat the common ills of calfhood and prevent scours.

Savings with Replacer

On the economic side, the feeding of milk replacers is entirely dependent on the relationship of the price of the replacer to the price of whole milk. When milk is cheap, the dairyman is inclined to feel that he can spare it for his calves. As the milk gets in short supply and becomes more valuable he begins to look around for a substitute. Unfortunately, milk replacers are like most other supplies the farmer purchases. Their price does not fluctuate in a direct correlation to the price of his product. As the price of milk advances, the milk replacer will very likely go up, too, especially those that are based on a milk by-product like dried skimmilk or dried buttermilk. But they do not ride the downside of the chart when milk prices start to slip. There are too

The county agent can pick the calf that has had the right growing ration. The calf's bone and coat will back up his judgment.

This draft-free calf pen developed by the University of Kentucky has three plywood sides and a raised wooden floor.

many "sticky" costs—labor, packaging, shipping, and so forth—involved in their processing and distribution.

One pound of replacer dissolved in 9 to 10 pounds of water will generally do the job of 8 to 12 pounds of whole milk. Using an average of one pound of replacer to ten pounds of milk, the table at the bottom of the page shows the saving that can be expected per calf on each 25 pound pail of milk replacer with milk selling from $2 to $6 per hundred and milk replacer at $4 to $5 per 25 pound pail.

One of the replacer manufacturers puts out two formulas, one based on blood flour, an excellent source of highly digestible protein, and botanicals such as St. John's Bread, foenugreek and anise, and the other based on dried buttermilk. The first mentioned formula has been on the market for more than 35 years, the latter was developed in 1951. Both currently sell for the same price, around $4.65 for a 25 pound pail, but the older formula does almost twice the work of the newer one. The catch is that the blood flour formula is a little more difficult to handle since smaller amounts are fed and the farmer must use more care in mixing and feeding it. The manufacturer recommends that the calves be eased onto the older formula gradually, say from about the fourth to the tenth day. Twenty-five pounds of this product and about 80 pounds of whole milk with home-grown grains and hay will take care of a calf up to six weeks of age.

The calf can be switched to the buttermilk based formula more abruptly, but it will take about 50 pounds of this one and 18 pounds of whole milk, hay and grain to carry it to six weeks.

Silas Lammers, New Knoxville, Ohio, a dairyman with a herd of high producing Brown Swiss, never hesitates to use milk replacers when the price is right. "When milk is selling for better than five dollars and you can buy a replacer for around eight and a half for a fifty-pound drum, there's no point in feeding whole milk to the calves," is his way of looking at it. "But when milk is below five dollars and fifty pounds of replacer costs ten dollars or more, that's a different story."

Conner Prairie Farm, Noblesville, Indiana, is working on the development of a dairy type animal produced from a cross of Jersey, Brown Swiss and Red Sindhi Brahman cattle. You don't go out and pick up that kind at the local salesbarn when old Mable reaches the end of her usefulness and you need a replacement. So it is doubly important at the Indiana establishment that they raise healthy, well developed heifers.

"Our calves raised on milk replacer are thrifty, with good bone and a good hair coat," says Fred Lemmon, the dairy husbandman. "We're always real pleased the way they turn out and our standards are really stiff."

Like any other baby, a heifer needs personal attention for the first six months; when there is a hurry call the herdsman who is on the job can usually stop scours before it reaches the dangerous stage.

Conner Prairie's method of feeding is to take the calf off the cow three days after birth and introduce it to the nipple pail. When it is about five days old they begin to reduce the whole milk, replacing it gradually with the milk substitute and water. By the time it is ten days old the calf has seen its last drop of whole milk.

In the days when they were raising Holsteins at Conner Prairie they found that with whole milk at $4.30 per hundred and a 50 pound drum of milk replacer selling for $10, they could carry their calves for the first 122 days on replacer plus feed and hay at a cost of 24½ cents a day. When whole milk was used the daily outlay was 27½ cents.

(*Continued on page* 106)

Selling Price of Milk 100 lbs.	Value of 250 lbs. of Milk	Saving per Calf When 25 lbs. of Milk Replacer Costs				
		$4.00	$4.25	$4.50	$4.75	$5.00
$2.00	$5.00	$1.00	$ .75	$ .50	$ .25	$ —
2.50	6.25	2.25	2.00	1.75	1.50	1.25
3.00	7.50	3.50	3.25	3.00	2.75	2.50
3.50	8.75	4.75	4.50	4.25	4.00	3.75
4.00	10.00	6.00	5.75	5.50	5.25	5.00
4.50	11.25	7.25	7.00	6.75	6.50	6.25
5.00	12.50	8.50	8.25	8.00	7.75	7.50
5.50	13.75	9.75	9.50	9.25	9.00	8.75
6.00	15.00	11.00	10.75	10.50	10.25	10.00

Hub Feeding

By Robert Carmody

WHEN A WHEEL is in motion, the hub does its share of the work, but without all of the great rush and bustle of the spokes or rim. This quiet efficiency of a hub which accomplishes lots of work with little motion gave Leslie Myers and his son, Max, an idea for a new set of pasture lots for their sows and pigs. Laid out on the Myers' farm at Wallace, Indiana, the lots radiate from a hub where almost all feeding and watering is done.

"I think the hub type layout is about the best idea we've had on this farm," big, white-haired Leslie Myers said recently. "It saves us at least half the labor of caring for the sow and pigs and saves on equipment, too. We use a single big feeder for the pigs in four lots. There may be as few as two sows and their pigs to each lot or as many as six sows and pigs, depending on the ages of the pigs. Watering, too, saves on pipe. We have a waterer for each lot, but it only takes a few feet of pipe to reach all of the waterers around the edge of the hub.

"We feel that we can keep a sharper eye on the animals when we have them grouped around us this way. And when it comes to moving sows and pigs together, a hub just can't be beat. You have to group pigs of the same size or you're going to run into trouble, but, I swear I can't look at pigs in a pen over here and tell if they're the same size as a bunch down the road. With a hub layout you see them close enough to compare size and move them out one gate and right in the next."

During the winter, the Myers keep sows and pigs in pens which surround the feed mixing center like a half-hub: the rest of the time they keep two hub layouts running as long as there is a leaf of pasture. They also use a few individual paddocks. The pasture lots are used for three years: then the fences are ripped up and the hub is moved to new ground. "We build a hub in a six to eight acre field, in which we've had a mixture of alfalfa and ladino hay for a couple of years. We start by fencing in a road to the center of the field, where the hub will be located, and then put up fences from each corner of the field to the hub," Leslie Myers said, drawing the fences with his amber pipe stem on the palm of his square farmer's hand. "This gives us four big paddocks with the road cutting one of them in two. We then run fences down the middle of the other three and divide them, which gives us our eight lots. At the hub we set up our feeder so that the fences cut each side of each feeder into two parts: that way one feeder takes care of sows in four lots; the pigs are fed in creep feeders. We haven't been able to work out a similar arrangement with the creep feeders and still keep from mixing pigs from different lots, so we have to use one creep for each lot."

Max Myers, Leslie's son, who has the powerful build and calm disposition with which most good livestock men are equipped, said, "Dad says that the pastures are alfalfa and ladino, but that's only true for a short time. We seed alfalfa and we get it for hay, but when it is pastured, it soon disappears. The pastures all end up straight ladino. And there's a plant that can take it. At the end of three years of heavy pasturing, when we're ready to move the hub to new land, the alfalfa will be gone, but the ladino will still be in there fighting."

Moving the hub and all of its fences is not as difficult on the Myers farm as it might sound. "We figure it takes us two full days for the four of us, Max and me, and the two men," Leslie Myers said, and then laughed. "Of course, that doesn't break it down to man hours, because we do all the rest of the farm work along with moving the hub. We use steel posts for every other post on the fencing, and then we've got our fence stretcher which makes all the difference in the world."

"Our fence stretcher" is a curious rig made from an old automobile frame with the wheels still attached. In the center is a cable-reel that once graced the front of an army six-by-six. This reel, which the Myers secured complete with its gears, is turned by a drive shaft connected to an old Ford transmission which in turn is connected with the power take-off. When the stretcher is to be used it is pulled into position by the tractor, a steel rod is braced between the corner post and the stretcher, the cable is attached to the fencing, and power is applied. The cable is slowly, but very powerfully reeled in, pulling the woven fence as tight as is wanted. The fence can be pulled tight, stapled, cut, and wrapped around the post in a matter of minutes.

The concern with labor saving is understandable on the Myers' farm, 650 acres of owned and rented land, on which they also operate a 200 sow pig hatchery. They began the pig hatchery back in 1951 and have farrowed around 30 sows a month every month since, except last December when, as Leslie Myers puts it, "We just wanted a little rest—that's the most anyone can make out of it."

Pigs are farrowed in a tile brick, 30 stall farrowing house which was built when the pig hatchery started. The sows and pigs are held in the house for two weeks. This is as long as Leslie Myers has been able to get the pigs to do well indoors even with sod, copperas, antibiotics, trace minerals, iron pills, and every other known anaemia preventive. At two weeks, give or take a day or two to sidestep bad weather, the sow and her litter are moved to pens just outside the farrowing house where they can toughen to the out-of-doors for a week under close observation. Then they are moved to the pastures which ring the hub. Two sows with their litters occupy a paddock for a couple of weeks and then are grouped with two or four sows with pigs of the same size.

With the hub arrangement and self-unloading wagons, feeding is as nearly automatic as they can make it, even to the grinding and mixing of feeds. Leslie Myers looks with affection on a tremendous, white, cupola-topped barn which his father built in 1903 to house the 15 teams of horses they used then to run the farm. Today, this ornate structure is simply a shell which shelters the grain bins, unloading pits, mixers, grinders, and augers which go into the junior-sized elevator they need to handle the feed.

Corn bins holding 10,000 bushels and oat bins are loaded automatically and the grain is augured into the hammermill and blown into the mixer to be blended with supplement, without the use of any manpower. Around the bins, which are in the center of the barn, is space for baled hay, more space than they have ever needed. "We grind the corn and oats together and add the alfalfa meal and supplement. Grinding the alfalfa is a different matter," Leslie Myers said, hammering out the dottle from his pipe. "Grinding alfalfa is the worst job on the farm, so we grind as much of it at a time as we can. We start grinding and the dust rises until you can't see. When everybody can't stand it any longer, we stop and hope that we've got enough meal to last us a good long time."

A bazooka type auger lifts the feed from the mixer, the bin, or licks it up from a pile on the floor and loads it into a mechanized wagon. The feed is then driven to the hub and augered into the big self-feeders. One point the Myers

The hub (above) is the feeding arrangement which has cut summer hog labor in half on the Myers farm. The fences which radiate from it slice a six or eight-acre field into eight pasture lots, with one big feeder taking care of four lots. Each lot has a separate waterer and each has its own creep feeder for the two to six litters of pigs which it holds. Leslie Myers and his son Max (below), who built the hub, operate a 200-sow pig hatchery. They are shown here in their thirty-stall farrowing house which is used every month of the year. There's a skylight over each pen.

would emphasize is leaving enough room for tractor and wagon to maneuver in. In one of their hubs there is too little space and time is lost backing and filling.

The watering arrangements are simple indeed. Water is piped to the hub from the farm well in plastic pipe. Each lot has its own water tank with two watering bowls. Both the watering bowls and the water that is piped to the tank are regulated by float valves.

With this excellent mechanization, four men, with the half-time help of a fifth, grow all of the feed necessary for the herd and keep a steady monthly flow of about 240 weaned, vaccinated, wormed, oil-sprayed pigs from brucelosis tested sows going out to their contract customers.

"The pig hatchery business is not so new as some people think. We say that we started in the hatchery business in 1951," Leslie Myers said, "but way back when I was farming with my father right here on this same place, we were selling sows and their week-old litters. I've put as many as 200 sows and litters through the sales barn in a year in the old days and we still sell off a few that way today. What *is* new is that we are selling two or three times as many pigs today and with less help. Mechanization is one reason we're able to do it; another is the easy, labor-saving arrangement of our feed lots."

Mechanical Pastures

More and more farmers are pasturing their cows at a feed bunk They double their pasture capacity and minimize bloat

GREEN FEEDING is winning new friends. Green feeding—*soilage, mechanical pastures, zero pastures, clip feed,* call it what you will—consists of bringing fresh-cut forage to the cattle in dry lot. Almost everywhere the system has been tried, a cult of green feeders has developed who are eager to point out that this method has almost doubled the carrying capacity of their pastures. In some cases green feeding was not started primarily to stretch pasture, but as a solution of some other problem.

Dale Sebens, tenant on the Horton farm at Tuscola, Illinois, started green feeding two summers ago after losing a score of feeder cattle from bloat. "I used to be afraid to turn them out," he says, "but since beginning green feeding, we haven't had one serious case of bloat."

Guy Davis, Delaware County, Ohio, dairyman, has very little pasture near his milk barn. His acreage is scattered one to two miles away. Green feeding gave him a chance to triple his herd, with centralized milking and without rounding up the cattle and bringing them in from a distant field.

L. E. Maxfield of Lemax Farm, North Hartland, Vermont, faced a similar problem. His dairy barn is on one side of U. S. Route 5, his fields on the other. With traffic heaviest at milking time, bringing the cows across the highway was too hazardous. Crossing during traffic lulls with wagons of fresh forage has solved the problem of green forage for his herd.

Cecil Robinson of Radnor, Ohio, started green feeding with a double purpose. His pasture fences wouldn't hold western cattle; he couldn't keep them out of his own or his neighbors' corn. Besides, a change to a three-year corn-oats-meadow rotation left him with too much early pasture and too little later on. For him, green feeding in dry lot eliminated a two-sided headache.

The Cattle Feeder

To W. D. Caldwell, near Des Moines, Iowa, the advantages of green feeding add up to one big benefit—more dollars from the same land. His five hundred level acres are bounded by roads. "Not a line fence or a field fence on the place," he points out. None are needed. Crops are planted within inches of the right of way, adding acres to what used to be fence-row weed nuisances. There are no shade trees to plow around, no over-fertilized or fouled and wasted forage spots from lolling cattle. The meadows are lush, uniformly productive, and weedfree.

Caldwell farms intensively. "There's no use liming and fertilizing heavily and then have cattle waste good pasture or walk off their fat looking for shade and water," he argues. "A steer is too inefficient to harvest his own forage. With green feeding, you get it all."

His cattle, usually feeders of medium grades, are confined to cemented paddocks. He "boards" about 600 at a time, with up to 1700 in a year, sometimes on a short feed, more often on a longer roughage program for economical gains. Shade, water, grain, hay, and bedding reserves and pit silo are centralized at the paddocks.

Green feeding takes labor, but it stretches a pasture field, at least by a third. On the Caldwell farm three or more tractors and drivers are busy at green feeding and making silage most of the summer. But the same number of acres produce green feed and silage for at least a quarter to a third more head of cattle than Caldwell's pastures used to support.

"Soilage is just reversing the direction of your empty load," Caldwell says. "For us, it is just as simple to bring in forage as it is to carry grain and water to a distant pasture. Here we have the cattle where we can keep a close eye on them. We get better control all along the line, not only in feed intake, but of ailments and injuries. Better control of flies, too. Of course, there's manure to spread, but

Buck-rakes bring long-cut pasture to the feed lot. These new type rakes have a mechanical pusher to shove the hay off the tines into the bunk. They are also used for making long-cut grass silage.

A forage chopper blows the legume clippings into a self-feeding wagon. Mixing the chopped stems with the tender leaves helps eliminate bloat. One wagon-load is a day's feed for 35 cows.

A chicken or a cow may cross the road just to get to the other side, but with today's traffic she may not always make it. In Vermont, where tourist traffic is heaviest in the summer, L. E. Maxfield brings chopped legume pasture to his Holsteins three times a day. The self-unloading, side-delivery wagon saves labor. Chopped green feed saves grain; with mechanical pastures, Maxfield gets five pounds of milk for each pound of grain fed.

we can spread it evenly, where we want it."

Caldwell feels that some farmers are confused when they hear of feeding *clippings*. "They think all of us feed short stuff. Actually, in our operation we cut meadow crops and small grains nearing maturity. About the first of June we go from silage to soilage, eliminating or cutting back on any supplement we might have needed to balance our winter ration. Once we hook up to the forage harvester, we never used to unhook it until the middle of October; now we never unhook it. Last fall we designed our own home-made forage chopper. It's a sort of hammermill on wheels. The hammers, or swinging knives, suspend from the axle and cut a swath almost eight feed wide. An enclosed fan blows what we call 'lacerated' grass directly into a trailer.

"When we found this machine created a suction below the knives, which worked well in picking up lodged crops, we provided an adjustment of the knives so they could be let down lower than the wheels. That way we can use the outfit for digging silage loose from our pit silo when we feed it. We just pull the chopper lengthwise over the top of the silage for loading into a trailer. The chopper digs an 8-foot swath about 6 inches deep from the top of the pit silo. It can dig and blow a wagon full in a few minutes. Of course, we have to feed enough cattle every day to prevent the exposed silage from spoiling.

"Now we keep the cutter coupled to a tractor every day in the year. (We plan our silage to last until early cuttings of brome-alfalfa come along. The first loads in the morning and the last loads at night go to the feed bunks. During the day we fill the silos.) Between meadow cuttings, there are oats in the milk stage for green feed or silage. Later, there's corn, if needed."

Caldwell is slowly ironing out the rough spots in green feeding. At first the clippings were hand-shoveled from wagons into feed bunks. Last year Caldwell rigged up a large two-wheeled trailing hopper which he kept attached to his harvester. A conveyor inside it discharges the cut forage over a high lip into canvas-belt, end-unloading wagons for transport to the feeding paddocks. The paddocks are separated by feed bunks with space enough for the wagon to drive down the center and unload. Grain is spread on top of the load and is evenly distributed while unloading. Caldwell has one more step ahead. He is working out a molasses, tank-and-pump unit to mount on the harvester for mixing at the spout as the wagons drawn alongside are being filled.

Northeastern Dairyman

The Vermont farm of L. E. Maxfield and Sons has only 35 acres of improved pasture on the barn side of the highway. It didn't take long for his 115 Holsteins to start bawling for the green fields across

(*Continued on page* 103)

Money in Quail

You can't be neutral about a quail. To some he is a song bird, the symbol of the peace and plenty of our American countryside and of fields heavy with harvest. To others he is the top game bird of America, the last word in eating pleasure, and an expendable item for the sportsman.

The quail is disappearing at an alarming rate from our fields and thickets. Modern farming and recurring droughts have destroyed his food and cover. Hunters in ever-increasing numbers pursue him.

For many years a number of states have supported farms where quail are raised for restocking. Then, a few years ago, a number of private individuals became interested in raising quail on a commercial basis. Their numbers are increasing and from them you can now buy quail for breeding, restocking, field trials, or as meat for your table.

Raising quail is a farm specialty. You'll not get rich at it, but if you are willing to take the time and the infinite patience needed to learn the complex know-how, you can make a living. The industry is young and the demand exceeds the supply. Quail can be successfully reared in captivity anywhere in the United States. Carl Lowrance, of Joplin, Missouri, the "Quail King of America," is willing to share his experience in the rearing and marketing of commercial quail. Lowrance is starting his sixth year in the quail business. He brought to his new venture a business acumen as well as a lifetime interest in quail as a game bird.

Last year he produced 40,000 birds on his 40-acre farm near Joplin. His plant, which includes rearing and laying pens, brooder house, hatchery, grain storage, and a small plot where he grows green feed for the birds, covers not more than fifteen acres. He buys all feed and grain. His head man, a sharp young fellow with the improbable name of Eldon "Red" Corn, has two helpers the year 'round. During the busy season Lowrance's wife, two sons and a daughter work full time.

The first settings on the Lowrance ranch are made about the first of April, and the hatches are timed to come off every Tuesday during the season. The incubators are ordinary poultry incubators with trays adapted for the small quail eggs, which are about the size of the first joint of a big man's thumb. Each of the six incubators holds 3200 eggs. The temperature is set at 99¾ degrees, the same as for chickens, and held there by thermostat control. Humidity is kept at 84 to 86 per cent for 20 of the 23 days it takes to hatch a quail egg. The eggs are given a 90 degree turn every eight hours. The rack containing the trays is mounted as a movable unit and the entire rack is turned by a crank outside the incubator. Turning the eggs is necessary to prevent the adhesion of the embryo to one side of the shell. This job is done in the wild by the parent quail.

After the eggs have been in the incuba-

Each pen (above) on the Lowrance ranch holds 150-175 adult birds. Males and females are separated to prevent fighting. These are males. Carl Lowrance (right) demonstrates the proper way to hold a quail to prevent injury. The male, left, is identified by his white throat and slightly larger size.

These plants were taken from a field planted for quail cover. Left to right they are: Sudan grass, sorgo, brown millet, soy beans, broom corn, golden millet, sesame, and rape. Other favorites are milo maize and lespedeza. Many of these feeds, plus corn and wheat, go into the ration of birds grown in captivity. A quail will eat the same greens as humans. Favorites are rape, chard and lettuce.

tors 20 days, they are taken out, candled, and placed in hatchers for the remaining three days. The hatcher is simply an incubator equipped with trays instead of racks. The eggs are placed loosely in the trays, each of which are covered with a wire screen to prevent the chicks from escaping. The humidity is increased to 95 degrees in order to soften the shell and prevent dehydration of the bird. Nature has so delicately timed development that once hatching has started, the chicks pop out of the shells like corn in a popper. The entire tray of several hundred eggs hatches out in a few hours.

As though triggered by a timeclock, all the chicks in a hatch begin cutting through the shell at the same time. On the top of the upper beak is a horn-like projection, very sharp and hard, which the chick uses to cut through the shell. A complete turn is made in the shell and the top of the large end drops back like a lid to release the chick. If the chick is weak, or the shell is tough and hard, or dries out from lack of humidity, it perishes before it can release itself from the shell. The horn drops off within an hour after the chick is hatched. Lowrance says, "The best way to insure lively, strong chicks is to feed the hen well from the day she is hatched. All the necessary vitamins, minerals, proteins and other body building ingredients to build a healthy chick should be in the egg. These can get there only through the parent bird."

As soon as the chicks are dry, they are taken out of the hatcher and placed in the brooders. Even though they are so small that 78 can stand on a dinner plate, they are very active and strong and can be handled freely without injury. The brooders, designed by Lowrance himself, consist of a commercial brooder unit with fan, a hinged hover, 14-inch sidewalls, and a hardware cloth floor with a removable dropping tray beneath. Water and feed are served in ordinary chicken equipment. A 25 watt bulb is red, which cuts down on cannibalism. Colored marbles are dropped into the waterers to prevent drowning and to attract the chicks. Each chick is given its first drink by dipping its beak in the water.

A fan above the brooder creates a draft which prevents the birds from piling up outside the hover, and the sides are beveled. The brooder temperature is held at 95 degrees (room temperature 90 degrees) and is decreased 5 degrees each day until the birds are taken out of the brooder at 5 weeks of age.

Two or three times a day the chicks are fed as much as they will clean up of chopped chard, lettuce, or apple. This not only supplies nutritional necessities but helps to prevent cannibalism, to which birds raised in captivity are addicted. The greens are chopped fine and as much as possible of the water squeezed out by hand. Washy greens will give the birds diarrhea. Aureomycin, TF5 (Lederle) is given at all times in the drinking water. This is an innovation made by Carl Lowrance and to it he ascribes the extremely good health and vitality of the birds he raises.

A stock solution of the aureomycin is made by mixing ⅓ teaspoonful to one pint of water. One teaspoonful of this stock is mixed in one quart of the drinking water. Mature birds get 3 teaspoonfuls of aureomycin in each 55 gallons of their drinking water.

The chicks are debeaked at 5 days by touching the sharp point of the upper part of the beak against an electric hot plate. This causes the chick no pain and prevents pecking and cannibalism. A second debeaking follows at 4 weeks. Pecking and

Red Corn holds two traps used for catching and carrying the quail. The open end of the trap is placed in a doorway and the birds flushed into it.

Carl Lowrance stands beside the laying pens. Each section houses two pairs. In the distance are the rearing pens.

These chicks are only two days old but they are strong enough to swing from a blade of grass held in the beak.

cannibalism are apparently unknown in the wild.

In addition to the greens and water, the chicks get a commercial starter, 28 per cent protein, made especially for game birds. Most of the big feed makers make a game bird starter. Lowrance feeds Purina, the formula for which was worked out partly on his ranch in cooperation with nutritionists from the company. At two weeks of age the chicks are given a limited amount of finely cracked grain.

Lowrance has found that the quail prefer grain, since it is their natural food, and if they were given free choice they would fill up on grain, and their diet would be unbalanced. Feeding must be regulated so that the bird eats his prepared feed first. Lowrance has worked out a grain mixture which he believes is just right for quail—three parts milo, one part cracked wheat, and one part cracked corn. The only difference between the grain for the young and old birds is that it is cracked finer for the young birds.

At five weeks of age, the birds are fully feathered and are ready for the outside pens. They can go on their own then without supplemental heat, and are transferred to rearing pens, each pen holding 350 birds. As they mature they are thinned out to half that number in a pen to prevent cannibalism and crowding.

It Ain't Easy

All this seems comparatively simple, and not much more difficult than raising a batch of chickens. Lowrance is quick to disillusion anyone who believes he can use poultry methods and techniques on quail. "Quail are more delicate and demanding than chickens," he says. "The first six days are the most critical. A slight change in temperature, a too-quick change of feed, or an accumulation of dirt or droppings in the brooder can set off an attack of diarrhea that will kill hundreds of chicks before you can say scat. Sanitation and cleanliness can't be stressed too much, for the young are especially susceptible to coccidiosis. Between each batch we scrub the brooders and brooder room thoroughly and then disinfect with pine oil. Then we fumigate with fungicide fog. We use paper plates for feed and throw them away after one use. We watch for droppings caught on the floor netting, and we watch the temperature like an engineer with a cranky boiler."

This meticulous care has resulted in some amazing records in low mortality on the Lowrance ranch. Records on the center post in the brooder house show these typical figures: 5490 brought in, 5358 taken out; 5280 brought in, 5130 taken out. These losses, 132 and 150, are typical, and represent less than 3 per cent. On the other hand, an epidemic of diarrhea, started by any one of a number of things, can kill several hundred in a few hours. Lowrance has consistently reared better than 90 per cent of his hatches.

"Quail show an amazing gift for ending their own lives in unusual ways," he says. "They'll hang themselves on a thread, crawl in a crack and smother, drown themselves, pile up, or choke to death on a chance piece of grain. Almost everything, from mouldy feed to a change of temperature, will give them the diarrhea. You can't take your eye off a quail for a minute."

The rearing pens are 16 by 24 feet, divided in the middle by a partition. The tops, sides and floor are of fine wire mesh on a wood frame, with a roofed shelter at each end. Water and feed are placed in the shelter and the open part of the pen is filled with cedar branches for shade and

(*Continued on page* 117)

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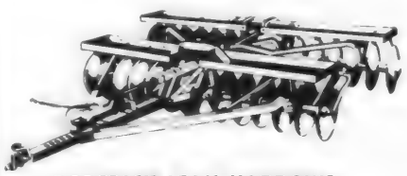

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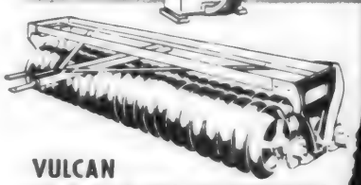

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76 Thorn Street, Coraopolis, Pennsylvania
Please send me more information on:

- ☐ Pittsburgh Deep-Feeder
- ☐ Harvey "Red-Hed" Elevators
- ☐ Harvey Hammer Mills
- ☐ Roderick Lean Harrows
- ☐ Vulcan Pulverizers
- ☐ All products of Farm Tools Division

Name_____
Address_____
City_____ State_____

FERTILIZER DEEP-FEEDER, EARTH-LIFT, CULTIVATING STEELS, DISC HARROWS, SPIKE-TOOTH HARROWS, SPRING-TOOTH HARROWS

Pittsburgh Rodrick Lean Vulcan Harvey RACINE LINES

ROTARY HOES, MANURE SPREADERS, ROLLER PULVERIZERS, SPROCKET PULVERIZERS, FARM ELEVATORS, HAMMER MILLS, CORN SHELLERS

LETTERS

(*Continued from page* 10)

Sirs:

. . . I would like to suggest you run the last two paragraphs first next time for the benefit of wives that were too angry to finish the story.

Mrs. Leona Carpenter
1415 Schrock Road, Worthington, Ohio

Sirs:

Where have you been the last fifty years, under the kitchen stove with the dogs? You probably haven't a wife, no one could stand you. Boy, would I like to meet you!

Mrs. Martha Oyler
Route 1, Marion, Indiana

Sirs:

. . . Perhaps I enjoyed it so much because I'm a farmer's wife who is broad enough across the beam to lift the back end of a wagon.

Mrs. Joe Heitz
Schuyler, Nebraska

Sirs:

What would you have us be—a colored slave (which is outlawed)? Or better yet, a jackass? Oh, Mr. McGinnis, I have been wondering—are you married? If so, I think it would be a great idea to send a humane officer in to look over the situation.

Mrs. Paul D. Leedy
Route 1, Butler, Ohio

Sirs:

If the author was serious someone should hold his head under water for about 5 minutes.

P. S.—I am a farmer's wife and have 3 sons.

Mrs. Gerald Race
Route 1, Greene, N. Y.

Sirs:

Well, you may know how a farmer should pick a wife, but believe me I know how to pick the editor for a farm magazine; always get one with a big fat head.

Harold Knox
Canton, Minnesota

Sirs:

I read "Farmer Takes a Wife" and was so disgusted. I am a town girl married to a very prosperous farmer. Well, my husband didn't marry me to see how many bales of hay I could carry. I'm five feet tall and weigh 109 pounds. I suppose you would have me married to some little shrimp who can't do a minute's work to earn a living. Who gets up at night with our little girl—I do. Who turns the lights out and locks the door at night—I do. Who calls my husband to get up in the morning—I do. No, I don't have big hands either, and you say I should. The more I think about this article the more disgusted I become. If you want to know what I look like, just come around some time.

Mrs. Max Jones
Route 2, Sheridan, Indiana

Sirs:

I just wish I could lay my hands on you.

Mrs. H. R. Gleason
Tampa, Florida

"We sure are in demand"

A flock of Hampshire Sheep is the ideal diversified live stock program for the cattle, hog and poultry breeder.

For Breeders List
AMERICAN HAMPSHIRE SHEEP ASSOC.
72-Q Woodland Ave. Detroit, Mich.

"My steel building cost less than other types of construction and offered so many more extras"

says Leland C. Clark, Elgin, Nebraska

Mr. Clark says he chose his Steel building because "of the low cost and ease of construction." Assisted only by members of his family, working in their spare time, Mr. Clark completely erected his 36' x 80' building in two weeks, and moved in his machinery.

Mr. Clark uses his Steel building for storing machinery and grain. He also has a repair shop in one end. "The sixteen foot doors let us drive in big implements, repair them, and keep them under cover," he says. At present he is storing three tractors, a corn picker and a combine, in addition to numerous other implements in his Steel building, *plus* 1,070 bushels of ear corn.

"I'm so completely satisfied with my Steel building," adds Mr. Clark, "that I plan to erect another to replace a wood barn that recently burned to the ground. Fire safety is another reason for my changing to Steel buildings on my farm."

For dairy cattle housing, grain and machinery storage, Steel buildings are ideal. They are big, strong, roomy, tight and dry, fire-resistant and easily grounded against lightning. And you'll save plenty on erection costs and upkeep when you invest in a Factory-Built Steel Farm Building manufactured with long-lasting USS Galvanized Steel Sheets for roof and walls, and a USS Structural Steel framework.

When buying a Factory-Built Steel Farm Building, ask for USS Galvanized Steel Sheets for roof and sides. These sheets have a zinc coating produced to ASTM Specification A-361. This is your assurance of a high quality building.

SEND THIS COUPON FOR FURTHER INFORMATION

Agricultural Extension Section, United States Steel Corporation
Room 4680, 525 William Penn Place, Pittsburgh 30, Pa.

I am interested in steel buildings for the following:

☐ machinery storage ☐ grain storage ☐ poultry houses
☐ hay storage ☐ dairy barns ☐ cattle shelters
☐ other .....

Approximate size or capacity .....

☐ Please have a Steel Building representative call on me with further information. Send information to:

Name.....

Address..... Town.....

County..... State.....

United States Steel Corporation produces high-quality USS Galvanized Sheets and Structural Steel which our customers manufacture into durable farm buildings. Your requests for information will be forwarded to the manufacturers of these buildings, and you will hear directly from them.

USS

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL

You can side-dress 40 to 80 acres per day with ARCADIAN® NITRANA® Nitrogen Solutions applied only 2 to 4 inches deep into the soil. Containing 37 to 41% nitrogen, these low-pressure Solutions feed your corn and other crops all the nitrogen they need for top yields. Side-dressing is easy, either alone or as you cultivate. No high-pressure fumes to fight. Just easy-spreading, low-cost nitrate and ammonia nitrogen that feeds crops all season long. Another low-pressure Solution, ARCADIAN URASOL*, provides ammonia and urea nitrogen.

Add nitrogen to irrigation water in the form of non-pressure FERAN* or URAN* Solution and do two jobs in one. An open drum or tank with a hose leading to a valve at the suction side of your irrigation pump is all the equipment needed to feed your crops nitrogen this easy, economical way.

Dribble on URAN or FERAN as side-dressing for your nitrogen-hungry crops. Dribble tubes or spray booms minus nozzles make this system of nitrogen side-dressing fast and easy. FERAN 16% and 21% Solutions contain ammonia and nitrate nitrogen. URAN 32% Solution provides urea, ammonia and nitrate nitrogen. Use ARCADIAN Nitrogen Solutions this summer, use them in fall and spring, too. You can apply them yourself, or your ARCADIAN supplier can do the job for you. Either way, your crops get nitrogen at low cost to build big yields.

Arcadian

PRODUCTS FOR PROFITABLE FARMING

Nitrogen Solutions
Pressure and Non-Pressure Types

American Nitrate of Soda
Improved Granular

A-N-L® Nitrogen Fertilizer
Pelleted

12-12-12 Fertilizer
Granular

Urea 45 Fertilizer
45% Nitrogen Pellets

Sulphate of Ammonia
Dry Crystalline

*Trade-mark

See Your **ARCADIAN®** *Nitrogen Solutions Supplier today!*

Feed your crops nitrogen the easy, low-cost, high-profit way!

NITROGEN DIVISION
Allied Chemical & Dye Corporation

NITROGEN DIVISION ALLIED CHEMICAL

New York 6, N. Y. • Ironton, Ohio • Hopewell, Va.
Omaha 7, Neb. • Columbia 1, S. C. • Atlanta 3, Ga.
Indianapolis 20, Ind. • San Francisco 3, Cal. • Los Angeles 15, Cal.

FARM BOOKS

(*Continued from page* 18)

these exciting developments. This organization is engaged in a hot war, not against Communism—though they may destroy the basis for Communism in the process—but against man's oldest enemies, hunger, pestilence, plagues.

The author of this exciting book on the history and works of FAO, Gove Hambidge, has been the Director of Information from its founding until 1951 and, since then, North American Regional Representative of this pioneering group. The book is handsomely illustrated.

Big Dams vs. Little Dams

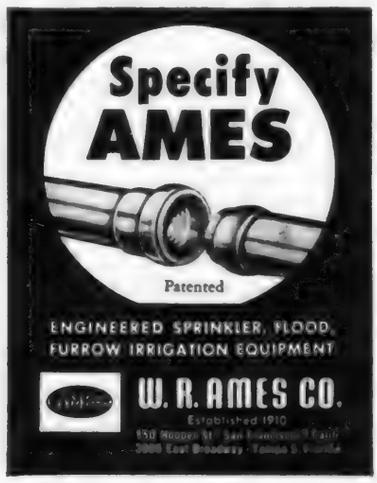
The Flood Control Controversy, *by Leopold and Maddock, The Ronald Press, New York, $5.00.*

Big Dam Foolishness, *by Elmer Peterson, Devin-Adair, New York, $3.50.*

The controversy between the men who feel that flood control should be handled down stream with great dams and reservoirs and those who urge that we control floods with land treatment and small holding dams at the headwaters of our streams is one which must be resolved correctly if we as a nation are to continue to grow and make great demands upon our water resources.

Leopold and Maddock look upon this problem with scientific objectivity, stating the problems of flood control and the positions of both the Army Corps of Engineers, who favor the big dam solution, and the Soil Conservation Service, who believe that land treatment and small dams can do the major part of the job.

Elmer Peterson in *Big Dam Foolishness* takes no such stand-offish attitude. This book is part of a running battle he has waged against the Corps of Engineers over the past 40 years. He believes with a certainty that we can farm our land in such a way that it will absorb and store many times the amount of rainfall that it now does and that small storage dams will hold back the little run-off which will take place and so prevent floods down stream. He is equally sure that big dams are nothing but silt traps which only increase the size and frequency of floods.



Eaton 2-Speed Axle

SQUEEZES DOWN OPERATING COSTS

FOR CITRUS GROWER

"WE CUT TIME TO THE PACKING PLANT with Eaton's high-gear range," driver Tom Matlock says. "We make top legal speeds while the engine operates at lower RPM. That means less engine strain and stress, greater savings on fuel, oil and engine wear."

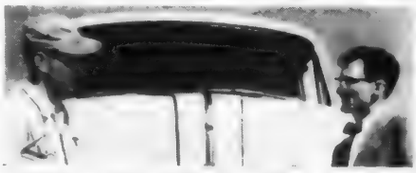
"FOR STOP-AND-GO DRIVING, Eaton's low-gear range is the greatest," says President R. L. Hampton. "With it, we pull smoothly out of soft ground, pick up the crop quickly, conveniently and economically."

"RECORDS prove the Eaton 2-Speed Axle is ideal for our operation," says R. L. Hampton, President and Manager of the Corona Foothill Lemon Co., Corona, California. "It reduces our costs."

Eaton 2-Speeds measure up best with driver Tom E. Matlock, too. "Inching through the groves, Eaton's pull in the low-gear range prevents us from getting trapped in soft ground with full loads. I handle our Eaton-equipped Dodge with ease and avoid that 'aching-back' feeling at the end of the day."

"On highway runs," continues Hampton, "Eaton's high-gear range delivers legal speeds at lower engine RPM. That saves engine strain, prolongs engine life and reduces gas costs. The Eaton 2-Speed always turns in a dependable job."

Get the facts firsthand. Ask your truck dealer to demonstrate the unmatched performance and efficiency of an Eaton 2-Speed Axle.



EATON

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

"WE ALWAYS RECOMMEND EATONS," reports Glen T. James *(right)*, owner of James Motors, Dodge truck dealer, Corona, California. To Tom Matlock, Mr. James says, "Dodge trucks with Eaton 2-Speed Axles assure farmers of top field and highway versatility. For us, it means satisfied customers who come back again for Eaton-equipped Dodge trucks."

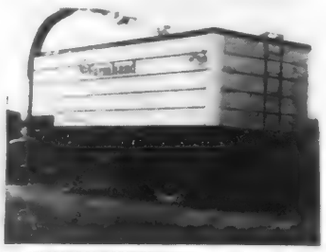
2-SPEED TRUCK AXLES

MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY

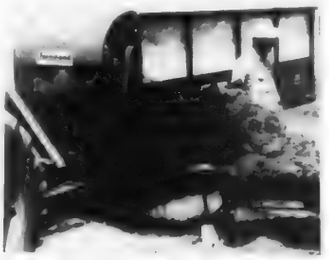
PROJECT ADEQUATE ROADS: Out-of-date highways slow you down, add dollars to your marketing expense. Get behind the crusade for better roads which are vital to the nation's prosperity.

"Green feed" your herd for low-cost gains!

BRING THE PASTURE TO THE COW and save up to 50% on feeding costs . . . boost production-per-acre an amazing 200 to 300% over conventional pasture methods. Modern Farmhand "Power-Box" Feeders make green feeding economical and practical. These big, dependable, self-unloading units—like the 2-beater, front-discharge, 6-ton model shown here—enable one man to easily feed over 500 head. Feed is uniformly mixed and unloaded by PTO power as you drive along. Unloads from 18" belt-type cross-conveyor. Optional elevator available. Choice of front or rear discharge.



THE VERY BEST FEEDER money can buy, that's the big new Farmhand "Superior" Feed Wagon. It's sturdy and light, with a level-load capacity of 520 cu. ft. Plywood-lined aluminum body, with steel frame. Double-apron, 4-chain conveyor, 3 mixing beaters and 24" belt discharge conveyor. Designed specifically for green feeding and silage hauling . . . a big unit for big operations.



LOW-COST, 4-TON "POWER-BOX" makes feeding and silage hauling fast, easy jobs. This unit hauls up to 135 bu., unloads in 1½ to 3 minutes. Two beaters thoroughly mix feed; 12" auger delivers it into bunks or blower hopper. Rugged and dependable with treated marine plywood floor and sides; heavy roller-chain conveyor. Front or rear discharge.

FARMHAND RUNNING GEAR

Tandem Trailer

Heavy-Duty Wagon

Farmhand®

FIRST IN FARM MATERIALS-HANDLING

FREE Illustrated Booklets!

Write: The **FARMHAND COMPANY** Hopkins, Minn., Dept. 402

☐ 6-Ton "Power-Box" ☐ "Superior" Feed Wagon

☐ 4-Ton "Power-Box" ☐ I am a student

Name_____

Address_____

Town _____ State_____

A Division of Superior Separator Company

THE DAIRY BARN

(*Continued from page 26*)

Shoo Fly

What's the best way to catch a fly? Sprinkle a little salt on his tail, of course. Don't laugh at the man you see sprinkling what looks like colored salt around his barn this summer to catch flies. He'll be using the very latest and one of the most effective remedies concocted to date. Actually, it will be something more potent than salt that he will be using. It will be one of the dry baits which were finally released late last summer. Because the Food and Drug Administration did not release them until late in the season they had only a limited opportunity to catch on with the farmer, though those who tried them found them just about the best and the most easily used killers that ever knocked a fly on his back.

Many of these dry baits depend on malathion, a stomach and contact poison, for their effectiveness. This organic phosphorous compound is also the base of the most effective liquid sprays. Diazinon and a chemical which goes by the name of Bayer L 13/59 are two other poisons used in the dry baits. So far flies have developed resistance to none of these poisons. The carrier may be sugar, hominy grits, even ground oyster shells coated with a confection of some sort. It is this tasty part of the concoction which provides the pulling power and is the factor that makes some of the baits more effective than the others.

The baits are just as deadly to maggots as they are to the adult flies. As a matter of fact, it was a maggot control experiment that lead Herman Mayeux, the developer of one of the baits, to the use of dry material. As Mayeux tells it, he and a co-worker were spraying a garbage dump in the heat of the Florida sun one midsummer day two years ago. They were trying to see how malathion would work on the maggots. Dragging the spray gun and hose over the stinking dump convinced them there must be an easier way to get the job done: some way like just scattering a powder out over the mess. That idea led to coating malathion onto a granular carrier. In this form it could easily be scattered by hand and the results were entirely successful. The granules penetrated the garbage mass to a depth of 3 to 5 inches and the larvae began dying within 20 minutes. It was noticed that the adult flies which touched the poisoned bait died, too. Immediately dry bait became a new and useful addition to the entomologist's bag of tricks.

The dry baits are not the final word in fly control. They are not a substitute for sprays. Dr. T. H. Parks, entomologist at the Ohio Experiment Station, and his colleagues in various other parts of the country, say they will be used to supplement the liquids. At peak seasons of fly infestation, both spray and dry baits will have to be thrown into the battle and, he warns, neither will be effective without a good sanitation program around the barn, barnlot and milking parlor.

The dry baits are put in shaker cans, which sell for about $1.25 per pound can. The farmer will find it more economical to buy in larger quantities, however. In 5, 10 or 25 pound bags and 50 pound drums the price is reduced considerably.

The user should be guided by the manufacturer's directions in applying the baits, but in general the instructions call for an application of anywhere from one pound to 2000 square feet to 3 to 4 ounces per 100 quare feet. At the lower rates the action is slower. With no mixing or measuring to be done the farmer can scatter enough dry bait to takes care of the average size barn in less than five minutes. The bait will attract and kill flies for several days on the outside and up to a week in enclosed areas.

The bait can be sprinkled on the floor of the barn, on window sills, around pens and in breezeways, where flies breed and congregate, even in garbage disposal areas.

Because of the small size of the particles it is unsatisfactory to use the baits on floors covered with straw or bedding of any kind. On floors to which lime or other alkaline materials have been applied, the bait should be spotted on something like old feed sacks.

The dry baits should not be used in the house nor in any place where children, domestic animals or chickens will come in contact with them.

"My corn profit paid for my Buckeye Corn Cribs in the first year. I found them easy to erect, absolutely rat-proof, and am well satisfied."

LAWRENCE B. SMALL
WHEATLAND, INDIANA

"We are well satisfied with our Buckeye Bins. Last year we figure we lost $1,500.00 by having to sell our grain at low market. This year we have made about $1,800.00 extra, or nearly paid for the three bins and drying equipment in one season."

E. G. GALLREIN & SONS
PLEASURE RIDGE PARK, KY.

"In 1954 at combine time, wheat was $1.75 per bushel. By storing wheat in a Buckeye Grain Bin on a government loan I got $2.32 per bushel which more than paid the entire cost of storage."

DARVIN D. MEYER
VINCENNES, INDIANA

"My father purchased the steel silo on our farm 40-some years ago. During the 40-some years we have utilized the silo with very little maintenance and it is practically as good today as when it was erected."

STANLEY A. CRIST
MIDDLETOWN, OHIO

SILVER SHIELD SILOS

The swing to Silver Shield all-steel Silos is proof of its many advantages over conventional silo constructions. This rugged, heavy-gauge silo more than meets the need for grass silage storage; no acid damage. Silage retains its full nutrient values . . . no dryed-out fringe. Oversized doors with same curvature as smooth inside wall allow maximum diameter unloader settings . . . eliminates clinging silage on walls.

So much more for your money...

Regardless of your farm storage problems, C&L silos, cribs and bins can more than meet your needs. All-steel construction of C&L storage buildings assures maximum protection against weather, fire, spoilage or rodents.

Finest proof in the world are these testimonies of satisfied farmers . . . proof that you get more for your money with C&L storage.

CLAYTON & LAMBERT MFG. CO.
MIDDLETOWN, OHIO

SILVER SHIELD BINS & CRIBS

Large Silver Shield Silo-type Grain Bins and newly-developed dryer-equipped cribs will more than pay for themselves through savings.

BUCKEYE BINS

Buckeye Grain Bins for the average farm needs are now completely equipped; exclusive perforated floor and portable blower are optional equipment. Avoid harvest risks (unpredictable weather elements and insects) by harvesting wet and drying the grain in the bin . . . thus assuring maximum earnings.

BUCKEYE CORN CRIBS

Rugged all-steel cribs with exclusive perforated wall design give maximum air flow without water entry. Buckeye Corn Cribs are easily erected by your own men.

SEND FOR FREE SILAGE FACT BOOK

C&L Silos, Bins and Cribs can save money for you, too. Write for literature without obligation today!

CLAYTON & LAMBERT MFG. CO.
Dept. SF, 1025 Lamneck St.
Middletown, Ohio

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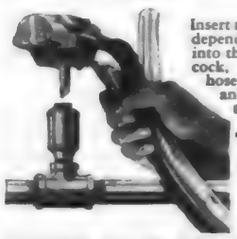
CO-OP® Universal
STANCHION TYPE SANITARY* PIPELINE MILKING SYSTEM

SAVES TONS OF "WEIGHT LIFTING"

Even with a small herd, your daily "milk lifting" will total a ton or more . . . lifting, carrying, straining and cooling . . . that's weight lifting that belongs in a circus.

With a Universal Sanitary Pipeline Milking System the milk is conveyed from cow to cooler automatically through a glass or stainless steel pipeline . . . all you need to do is transfer a light weight pulsator and teat cup assembly from cow to cow. Milk is not exposed to barn odor contamination and filtering is done in the line. The entire pipeline system is washed and sterilized in-place mechanically while you do other chores. You'll produce quality, low bacterial milk with less milking time and less effort. *That's Profitable Dairying* and worth looking into.



Insert the "world's most dependable pulsator" into the automatic stall cock, attach the milk hose to the pipeline and you're ready to milk.

*Also manufacturers of Universal Walk-Thru and Tandem Type Milking Systems, Floor Type and Suspended Type Milkers.

FREE PLANNING KIT

You'll find it helpful in laying out your own milking system. Ask your Universal dealer or write for your copy.

BACKED BY 39 YEARS OF MILKER MANUFACTURING "KNOW-HOW"

Universal
MILKING MACHINE DIVISION
NATIONAL COOPERATIVES, INC.
5042 First Ave., Albert Lea, Minn.

AMERICA'S FINEST DAIRY FARMS CHOOSE UNIVERSAL

Branches at: Waukesha, Wis., Syracuse, N.Y.

Dairymen call STA-FRESH® Best for Sweet, Green Silage!

Read What They Say:

"My STA-FRESH treated silage came out as green and sweet-smelling as the day I put it up."

"You should have seen my cows clean up the STA-FRESH silage—and no more silage stink!"

"It's the best way to get good silage I've ever come across. I'm using STA-FRESH from now on."

Yes, dairymen across the country are talking about STA-FRESH Sodium Bisulfite . . . the low-cost, easy-to-use powder that keeps silage fresh and full of good food value. Here are some of the reasons STA-FRESH has earned such enthusiasm:

1. *MAKES BETTER GRASS SILAGE.* By keeping silage fresh, STA-FRESH not only eliminates the "stink" of ordinary silage but helps the silage retain more food value. That means STA-FRESH Silage *is better for your cows.*

2. *LOW-COST, EASY TO USE.* Only eight pounds of STA-FRESH treat one ton of chopped grass. A simple applicator that you can make yourself mixes in the STA-FRESH powder while the grass is being blown into the silo.

3. *COWS LIKE STA-FRESH SILAGE, EAT MORE OF IT.* In tests where cows were given a choice between STA-FRESH silage and other silage, they ate *four times* as much of the STA-FRESH silage.

Write now for free booklet showing you how to get good green silage with General Chemical's STA-FRESH Sodium Bisulfite. There's a handy section on how to make your own applicator. And see your Orchard Brand dealer today—while his supply of STA-FRESH lasts!

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

THE MASTER'S TOUCH

(*Continued from page* 56)

bushel of oats per acre—that'll make good pasture by late summer. Flushing is an old sheepman's term, but all it means is to get the ewes gaining in flesh and condition."

If pasture is poor and a farmer has to feed grain, Barber advises straight corn, about a half pound a day starting about two weeks before breeding. The grain feeding should be stopped when the ewes start coming in heat. Barber believes a ewe should gain twenty-five or thirty pounds from the day she is bred to the day she lambs, but she should not get too fat. Too much fat causes hard lambing and she won't suckle well.

The rams need attention at this time, too. They should have a late summer shearing—"They'll work better," Barber says. Too much grain is as bad for the rams as for ewes. His rams get no corn. A quarter to a half pound a day of a mixture of three tubs of rolled oats, one tub of bran and a pailfull of linseed oil meal is his favorite ram ration.

"And keep them cool," he warns. "Run 'em in a cool spot in the barn during the day, if you can, a spot where there's a little breeze stirring, and kick them out nights. Heat is hard on a ram. Ninety degrees will stop most of 'em cold.

"We test all our rams before we put them with the flock and we test them during the season, too. Some time back we bought a good ram up in Ohio. We tested him and he was a real live one when we put him with the ewes. Then a few weeks later it got pretty warm and we tested him again and he was blank! He wasn't worth 'ooray!"

The rams at the experiment station are tested by examining a specimen of semen under a microscope to check the motility of the sperm. This is a quick and effective way of spotting an infertile buck; much better than letting a bunch of barren ewes tell the sad tale later at lambing time.

THE FARM'S PICTURES

Cover Photograph by Chas. W. Schwartz

26—Delmar Pendley. 28—Color by J. C. Allen. 28 through 31—Nebraska Weeds, Bulletin No. 101: Noxious Weeds, Iowa Bulletin No. 81-B: Some Important Michigan Weeds, Bulletin 304. 32—Fred Knoop. 33—Drawings by Fred Eichenberger. 34—Fred Knoop; Thompson Chemicals Corp. 35—National Fertilizer Review. 36—Drawing by Fred Eichenberger: Fred Knoop; Hurlon Ray. 37—Fred Knoop: Thompson Chemicals Corp. 38 and 39—R. J. McGinnis. 40—Northern Ohio Breeders Assn. 41 and 42—Fred Knoop. 43—Fred Knoop: Drawing by Fred Eichenberger; 44—Geo. Hoxie. 45—Howard Lathrope: Fred Knoop. 46—Geo. Hoxie; Howard Lathrope: Cliff Jones, Jr. 47—Grant Heilman. 48—Joe Munroe. 50 and 51—Drawings by Harvey Young. 51—Photo by Grant Cannon. 52 and 53—Skinner Irrigation Co. 54 through 57—Kazik Pazovski. 62—Werner Wolff, Black Star: Kazik Pazovski. 63—Joe Munroe. 65—Drawing by Fred Eichenberger: Grant Cannon. 66—Booster Buck Co.: Lundell Mfg. Co. 67—Myrton S. Reed. 68 and 69 Fred Knoop. 70—Kazik Pazovski. 71—Fred Knoop; Ralston Purina Co.

Another QUONSET® *FIRST* for farmers!

The ALL-NEW RIGID-FRAME 28

A straight-sidewall addition to the famous Quonset line, engineered specifically for farm use.

Check these important features of the RIGID-FRAME 28 Quonset building.

Louver—a 37″ x 14″ steel louver is supplied as standard equipment in endwalls with 14′ x 13′-6″ door, and in solid endwalls.

Sliding Doors—Two sizes of sliding steel doors are available—the 14′ x 13′-6″ sliding door for use in endwalls, and the 20′ x 12′ sliding door for sidewalls.

Walk Door—A 3′-6″ x 7′ swing steel walk door is available for use in either endwalls or sidewalls.

Windows—Four-light windows are available for both endwall and sidewall installations.

Post-Free Interior—Sliding sidewall and endwall doors offer maximum maneuverability of farm equipment.

Skylighting—Corrugated translucent plastic roof panel. Several colors are available.

Roof Ventilation—20″ galvanized steel roof ventilators with dampers are available as an accessory.

Paint—Quon-Kote paint, specially formulated for use with galvanized steel, is available in any of five harmonizing colors.

Insulation—The RF-28 can be insulated economically with either board, blanket or bat type material.

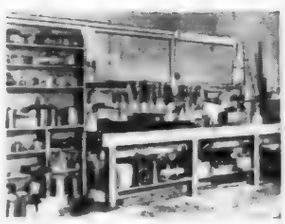
Unique Nailable Framing Members—Nails driven through collateral material into the nailing groove are deformed and clinched in a grip of steel—much stronger than the holding power of conventional materials.

Erection—Pre-cut to exact lengths punched for assembly with self-threading screws means minimum erection time. Either complete erection service or erection supervision is available through your Quonset dealer.

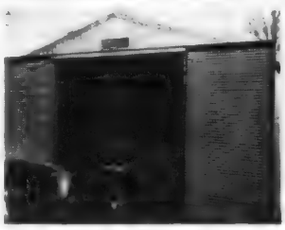
"Seal of Quality"—26-gauge steel sheets, galvanized with 2-oz. zinc coating for longer life and greater corrosion resistance.

Floor—Building is designed with piers for dirt floor, but plans are provided for partial or complete concrete floor if desired. The RF-28, and all buildings in the Quonset line for farm use, are easily financed on the Quonset Purchase Plan. See your Quonset Dealer.

Post-free interior and large, easy-to-slide doors in end and sides make the Rigid-Frame 28 ideal for efficient farm machinery storage. The enclosed end can be insulated to provide a complete farm shop.



A completely insulated handy farm shop such as this makes machinery maintenance and repair a comfortable job any time of the year. A 20-foot door in the shop sidewall admits even the widest machinery.



An economical hay storage and self feeding barn which serves as additional shelter as cows eat their way in. This adaptation of the Rigid-Frame 28 also provides extra machinery storage or utility space.

Used as a loose-housing barn, the Rigid-Frame 28 is roomy, and its post-free interior makes it easy to clean with power equipment. One end can be enclosed and insulated as a milking parlor and milk house.

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PHOSPHATE ROCK — a Paying Investment!

"ROCK RETURNS $19.72 NET PROFIT PER ACRE ON 1st YEAR'S HAY CROP— WITH 5 or 6 YEARS' PROFIT TO COME"

MARK H. BOMBERGER, Lebanon, Rt. #5, Pa., shows difference in yield of alfalfa cut from equal areas in same field: left, grown without Rock; right, where 2000 lbs. Rock per acre had been applied. Rock produced 1279 lbs. MORE alfalfa hay per acre on 1st cutting—2149 lbs. MORE per acre from 3 cuttings last year. Rock returned $19.72 net profit per acre the first year!

Try some Rock as a supplement to your fertilizer program

YEAR-AFTER-YEAR PROFITS

EDWIN VAN METER
Laurel, Ind.

"It takes lots of phosphorus for continued high yields of quality crops," says Edwin Van Meter, of Laurel, Ind., "and that's why Phosphate Rock pays out so well. For example, in Spring '51, I applied 1000 lbs. AA QUALITY Ground Phosphate Rock per acre on a 20-acre field of clover, leaving a check strip without Rock. I plowed this under for corn and kept the field in corn in 1951 and 1952, then followed with wheat, fertilizing each crop as usual with the AGRICO Fertilizer for the particular crop.

"I could see that the Rock application helped the corn and wheat yields, but didn't have a chance to check up until this year. The 20 acres where the Rock had been applied provided excellent grazing for 35 head of beef cattle from the time the wheat was cut until January 1, 1954.

"In Spring '54, where no Rock had been applied, the legume stand was thin, while the Rock area had an excellent stand. On 1st cutting, the Rock area yielded 3785 lbs. of hay per acre, or 1310 lbs. MORE hay per acre, worth $16.43 EXTRA per acre. This one cutting paid for the Rock, plus a profit of $7.87 per acre. I'm putting Phosphate Rock on all my fields this year."

MORE and more farmers, from New England to Texas, are applying AA QUALITY Ground Phosphate Rock as a supplement to their regular fertilizer program. Typical are the results reported by Mark H. Bomberger, Lebanon, Rt. #5, Pa., who tells you:

"Before preparing a 10-acre field for alfalfa seeding, I had A.A.C. Soil Service analyze the soil and advise me as to fertility levels and whether lime was needed. Their report showed adequate lime, a fair potash rating, but a very low phosphorus level.

"I decided that this would be a good place to try some AA QUALITY Ground Phosphate Rock, so I disked down one ton of Rock per acre in Fall 1952 on part of the field. Then the entire field was seeded to wheat and fertilized with Agrico 3-12-12, at 450 lbs. per acre. Alfalfa was seeded in the wheat early in 1953.

"Before the 1st cutting in Spring '54, you could plainly see where the Rock was applied—the stand was heavier and more uniform, with darker green color, a difference visible all year. The 3 cuttings made in '54 produced a total yield of 8,324 lbs. hay per acre where the Rock was applied, which was 2,149 lbs. MORE per acre than the yield where the Rock was omitted.

"This extra hay was worth $43.38 per acre, which repaid the cost of the Rock, plus a profit of $19.72 per acre. And crops to be grown where the Rock was applied will benefit for the next 5 or 6 years. I call this one of the soundest investments a farmer can make!"

Try Some Rock—See How It Pays!

Phosphorus is the cornerstone of profitable crop production. Intensive cultivation and high crop yields remove more phosphorus from the soil than is put back by usual applications of superphosphate and mixed fertilizers. Rock is the economical way to rebuild and maintain the phosphorus level needed to produce the top yields on which today's profits depend.

Try some AA QUALITY Ground Phosphate Rock on your farm—disk in 1000 to 2000 lbs. per acre. You will find that Rock is a profitable addition to your regular fertilizer program—an extra source of profit that often pays for itself the first year and then keeps on paying dividends year after year for 6 to 8 years, as the phosphorus in the Rock is steadily converted by soil acids into soluble form for plant use.

Let Our Soil Service Help You

Drop a line to our nearest office, listed below, and our free Soil Service will analyze your soil and recommend a complete fertilizer program to show you the best return for your fertilizer dollar.

AA QUALITY® Ground Phosphate Rock is mined and refined by one of the world's oldest and largest producers of quality plant foods—the makers of AGRICO,® the Nation's Leading Fertilizer and 18% NORMAL,® the Low-Cost, Extra-Value Superphosphate.

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FOR REAL ECONOMY, USE

AA Quality Phosphate Rock

FINELY-GROUND FLORIDA PEBBLE PHOSPHATE ROCK

Produced by the Makers of AGRICO®—The Nation's Leading Fertilizer and 18% NORMAL® Superphosphate

Mark the Ewes

"I've always been told that a ram shouldn't be asked to handle more than twenty-five or thirty ewes; is that right?" asks Stanley.

"Yes," says Barber. "If I have a large flock and the place is fenced for it, I like to split my ewes into bunches of twenty-five and put a ram in with each bunch. A lot of fellows will put four rams with a hundred ewes, but if one or two of the rams aren't fertile that puts all the work on the others. A ewe goes fourteen to sixteen days between heat periods, so if you use a ram to every bunch of twenty-five ewes and switch them around every thirty days you're going to have a much better chance of catching any sterile rams.

"You want to pay particular attention to your ewes to see if they are settling properly. If you mark your rams under the brisket with marking powder mixed with oil and change the colors every fourteen to sixteen days, you'll be able to tell which of the ewes have been bred and which keep coming back to the buck. Those that have been bred will be stamped on the rump.

"A farmer should have some system for marking each ewe permanently when she's bred so he'll know at lambing time which are the forward ones. This business of looking over the flock and saying 'There's one with a big bag. I'll keep her up.' is no good. I know. I've done it meself. But you can't pay much attention to the bag on a ewe for when she's going to lamb. One ewe might have an udder with a lot of flesh on it and you'll think she's about ready; another might have an udder without much flesh and her lamb will come before the other one's."

The Barber system works this way: The buck is turned into a bunch on a Monday, for example. At the end of the first week all the ewes that have been bred are marked with a red spot of branding fluid on the left shoulder. Those that are bred the second week get a spot on the near ribs; the mark for the third week is a spot on the near pin bone; the fourth week, on the off shoulder; the fifth week, on the off ribs; the sixth week on the off pin bone; the seventh week on the back of the neck; and the eighth week on the tip of the shoulder. Any of the early ewes that come back to the ram are re-spotted accordingly. Come lambing time it is then easy to pick out the ewes that are due and the whole flock doesn't have to be kept in the lambing barn at the same time.

Lambing Time

"All right," says Stanley, "this brings us up to lambing time. How do I handle my flock then?"

"Well, of course, you'll have separated the bucks from the ewes long before then," continues Barber. "I usually take me bucks out in time to finish lambing in March. Then a month to five weeks before they expect any lambs, start feeding

How to get
HIGH MILK PRODUCTION
from low-cost forage crops

Preserve the rich
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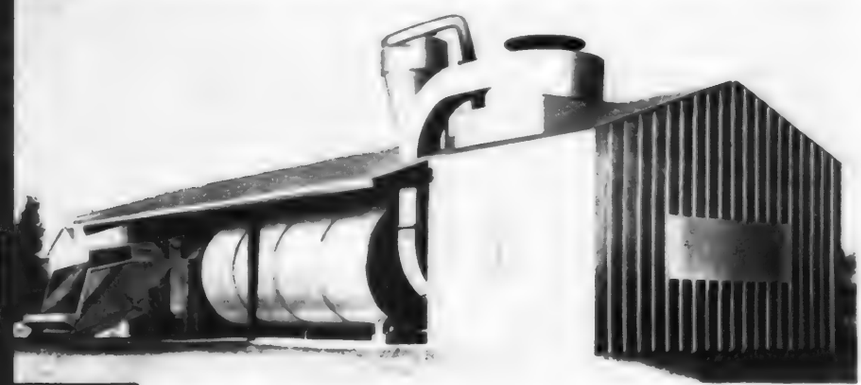

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Any dairyman who can grow and harvest forage crops on his farm can feed lush "green-pasture" rations the year 'round to keep milk yield high and production costs low.

With the new Ardrier Farm and Ranch Dehydrator, you can produce nutrition-rich feed at home, *and at a fraction of its market value!* In one hour you can turn 7500 lbs. of knee-high alfalfa at 75% moisture into approximately one ton of dehydrated chops, pellets or meal . . . with a protein value of 17% to 24%, a fat content of 2% to 3%, and seven times more vitamins than found in sun-cured alfalfa. This highly nutritious, palatable feed requires less grain and concentrates, yet cows respond with increased milk flow.

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ARD-55

Small photos show how the walls of the old dairy barn were out of plumb and bulging, with the sills rotted away. When the remodeling was completed, Steve Piekarski had a "new" barn, as shown in large photo at right.

Add years of useful life to old barns by remodeling with CONCRETE MASONRY

You get years of extra service from old buildings by remodeling with concrete and concrete masonry. Even old dairy barns such as that of Steve Piekarski, of Fergus Falls, Minn., with its rotted sills and walls out of plumb can be restored to years of new usefulness.

Steve Piekarski remodeled the old barn by raising it on jacks, cutting off the walls at the first floor ceiling line and realigning and leveling the old walls. He built new footings and concrete masonry walls. Result: a sturdy new barn.

After he replaced the outside walls, he rearranged the interior to accommodate 35 cows (instead of 26 under the old arrangement), a calf pen, bull pen and separate milk room with concrete masonry walls. Now the barn meets Grade A milk requirements. That means better milk prices and bigger dairy profits.

You can remodel many old farm buildings economically in this way. And because you can utilize much of the old structure you can save on material and labor. Since concrete masonry construction is moderate in first cost, needs little maintenance and lasts much longer, you get ***low-annual-cost*** service.

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the ewes some grain. Start off with a quarter pound of whole corn and work up to a half pound just before lambing. Give them plenty of legume hay—alfalfa is the best.

"See that they have plenty of room—don't crowd them. That's mighty important. Don't crowd them at the hay rack or the grain troughs or through narrow doors or gateways. If you have your grain troughs down the middle of the barn have a rail above them so the ewes can't jump over them. Or have the grain troughs below the hay racks so the leaves won't be wasted.

"Give them plenty of good, clean water. Don't let any dirt get in it. They want it clean and if it has the least smell they won't drink it like they should.

"Make some lambing pens out of gates or panels. Have them about four feet six inches square. But don't put a ewe into one of these pens until she's lambed. Maybe we ought to call these mothering pens insteading of lambing pens, because that's really what they're for, to keep the ewe and her lamb separate from the rest of the flock so she can mother him and keep him warm.

"Let her lamb in the barn, then put her and the lamb in the pen. If you put her in the pen before, she may have a lamb: then a twin comes. A pain hits her and she goes down on the first lamb and smothers it.

"Two or three days are enough to keep the ewe and lamb in the pen, depending on the strength of the lamb. Then you can turn them out with the flock. If there's a way to keep 'em separate I don't like to have my ewes and lambs running with the heavy ewes. The lambs are likely to jump up on the heavy ewes when they're lying down and that's hard on 'em."

"How important do you think it is for a farmer to be around the barn at lambing time?" Stanley wants to know.

"I think it's very important," is Barber's advice. "Generally when you're there everything's all right. But when you're not there it isn't. It's a good idea to look at your ewes about ten at night. If everything seems to be o.k., come back about three in the morning and then again around five or just before daybreak.

"Keep your hands in good shape, too, at lambing time — no lady fingernails. Trim 'em short with no ragged edges. Be sure you have no cuts or scratches. If you do, use rubber gloves if you have to take a lamb. Wash you hands and arms perfectly clean with hot water and soap. Then I use a mixture of one quart of olive oil and one ounce of pure carbolic acid to smear on my hands and arms. It's a good healer and a good disinfectant. The main thing when you're helping a ewe is cleanliness—and don't get excited.

"When a lamb is born always iodine his navel to prevent navel infection. When they get infection you might as well knock 'em in the head. It can clean a man out

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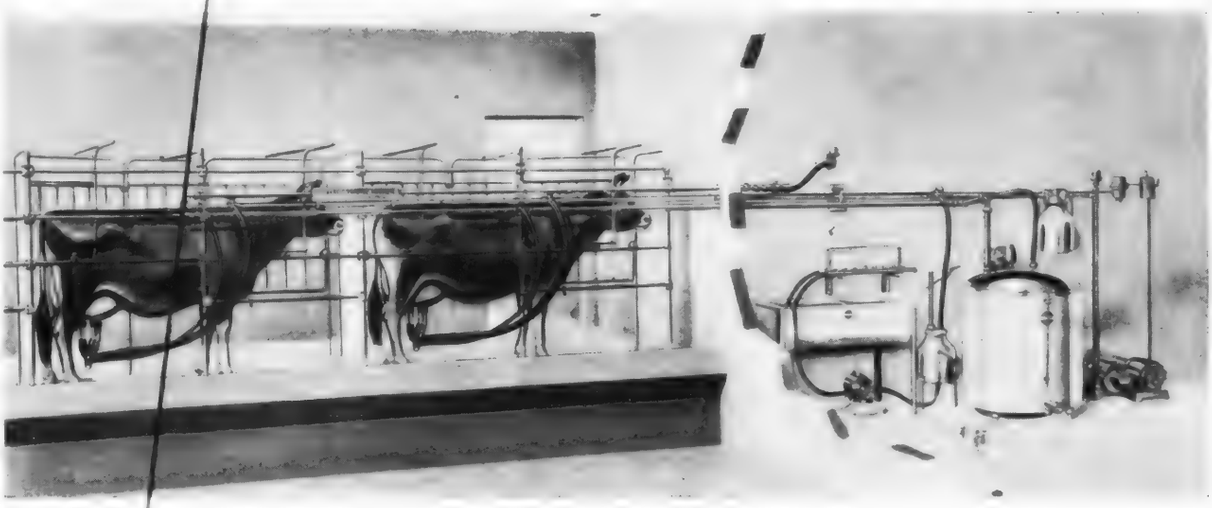

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of the sheep business. Keeping your barn clean and using iodine on the navel right away, not hours later, will prevent it. I have my iodine in a big mouth bottle, so I just pick up my lamb by the front legs and let his navel cord drop into the bottle.

"Sometimes a lamb is born that you'd think for sure is dead. Wipe the veil off his nose, blow down him, work his front legs, slap his ribs, pick him up by the hind legs and swing him. You'll usually get him going."

"What do you do with chilled lambs?" Stanley asks. "Take them in by the fire?"

"No," the shepherd replies. "I don't like to take a lamb to the fire. That's the way they get pneumonia. I use heat lamps. If you don't have electric in your barn and you have a lamb that's chilled, put three gunny sacks on the floor and wrap your lamb up in them. He won't smother. Put your hand in by his head and make an opening so he can get air. His breath will soon warm him up. Then take him out to the ewe and let him suck, or give him a little milk. After a little while take off one of the sacks; then after another little while take off another sack. Finally take off the last sack and cover him with it. It'll take a few hours to do this, but he'll usually be all right."

After a ewe has lambed, Barber sees to it that she gets a pail of clean water and he cuts down on her feed, at least for the first day. He sometimes cuts down on her feed for two or three days, depending on whether she had a single or twins, their condition, and whether or not she is a light or a heavy milker. If, for example, she had a single and was a heavy milker, he would probably cut her to half feed—about a quarter pound of grain and all the hay she can eat—for the full three days. If she had twins or was a light milker he would adjust the ration accordingly. Whatever the situation, he gets her back to full feed again after a few days and eventually he will get her up to a pound of corn a day.

If the ewe gives too much milk and the lamb comes down with indigestion—"He'll hump up, and back up and go down," is the way Barber describes the symptoms—he gets a big dose of syrup of pepsin, four teaspoonsful for a week old lamb. Twenty-four hours later he gets an enema.

The lambs are started on creep feed at two weeks. Barber recommends cracked corn. Crossbred lambs should gain about three-quarters of a pound a day with this to supplement their mother's milk.

Orphan lambs and wayward ewes that refuse to accept their lambs are as much a problem at the experiment station as anywhere else. Barber's guides in handling these situations have been shepherds' lore for generations. When he wants a ewe that has lost her lamb to adopt an orphan, he carefully skins the dead lamb and neatly fits the hide over the orphan, attaching it by bands of skin at the ankles and neck. If a ewe refuses to own one of

be your own rainmaker

In France some years ago an enterprising individual attached sticks of dynamite to a balloon which he sent into the sky. Upon reaching the clouds, the dynamite was detonated with the hope that the force of the explosion would produce rain. Needless to say, the experiment proved a failure unless, of course, nature already intended rain to fall.

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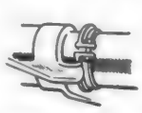

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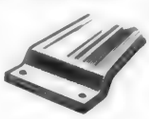

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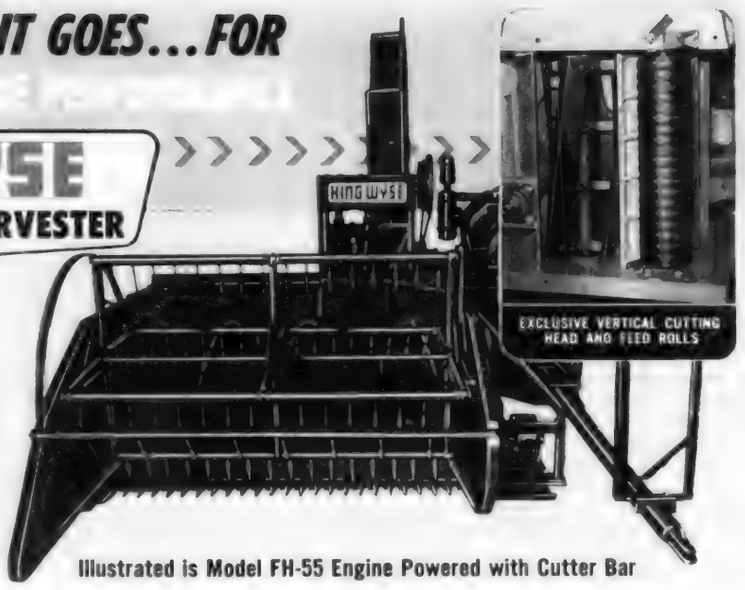

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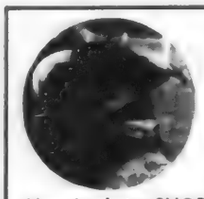

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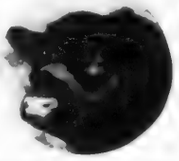

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a pair of twins, he resorts to the old trick of putting the two lambs in a barrel and letting them lay on each other and crawl over each other until they have both lost their identity so far as scent is concerned. He puts them out to nurse about every hour and a half, putting out the rejected one first.

Sometimes with a particularly stubborn ewe he has to adopt drastic methods, like putting a halter on her and tying her up in a narrow stall made of slats, a stall so narrow that she can neither lie down nor turn around and with the slats so arranged that the lamb can squeeze under them to suckle. "I had one once I had to keep tied up like that for a week, but she finally took the lamb," he says.

"You haven't said anything about treating the ewes for pregnancy disease," Stanley says.

"No, and there's no reason to if you'll handle your flock the way I've been telling you," is Barber's answer. "Prevention is better than a cure with pregnancy disease and if you feed your ewes right you're not going to be bothered with it. The veterinarians are saying now that our old prescription of giving molasses for pregnancy disease is wrong. They say the molasses just adds to a bad acid condition in the ewe and that the thing to use is glucose."

Docking and Castrating

Barber is acquainted with such modern instruments as the elastrator and the Burdizzo clamps for docking and castrating, but he still prefers the chisel and jackknife. A man who performed the operation later in the season would probably find flies and maggots a real drawback. Barber's lambs have forgotten all about the ordeal, though, long before fly time. His lambs arrive early and he goes into action when they are two weeks old. "I always like to dock and castrate in the morning on a nice, bright day," he says. "The lambs will have a chance to walk around all day then and they won't get stiff.

"Myself, I always dock with a hot chisel. I don't like the rubber band. If I'm going to have me head cut off I don't want it to take two weeks. I think that's the way the lamb feels about it, too. And there's always a chance of tetanus from the rubber bands.

"You don't want to have the chisel quite red hot when your dock. If you hit the joint it'll go right through like butter. There are four blood vessels in the tail, two up and two down. Just touch those blood vessels with the corner of the iron to check the bleeding. Daub on a little pine tar and carbolic oil and that does it. Don't rub the mixture on because that might start bleeding.

"I use the old jackknife for castrating. Then I know it's done. Rubber bands aren't so bad here as there's not much danger of tetanus. If you want to use the rubber bands on the tail a good way to do it is to put the bands on for about two days, then cut the tail off and there will be no bleeding."

Weaning

"Do you leave your lambs with the ewes right up to the time they go to market?" Stanley wants to know.

"Not if you want to get your ewes settled well when you go to breed them. I wean all my lambs the first of July, regardless of their age. This brings the ewes all up to breeding condition the same time. The morning after I wean the lambs I dose them for worms, then put them on clean pasture, usually rape and oats. To finish them out I like a red clover field. That's what makes them grow sideways. A little straight corn will help, too.

"My ewes I put on a bare pasture to dry them up. A heavy milking ewe I let go for about three days, then I ease her—I don't milk her out completely. I let her go three more days and ease her again and that's usually all she needs. I never have any udder trouble. The one thing with ewes is, don't ever let them get too fat."

And Worms

"You mentioned worming the lambs. Between tapes and stomach worms it sometimes seems a wonder any man can

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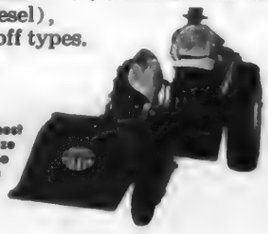

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stay in the sheep business," Stanley says.

"This place right here," says Barber, "is a perfect proof that a farmer can beat the worms. We have only about 33 acres around the sheep barn here at the Experiment Station and we've had our purebred flocks here since 1936. Those flocks have averaged about eighty-five breeding ewes, and their lambs, forty yearling ewes, and fifteen to twenty rams. Somewhere around a total of a hundred and forty-five head a year, not counting the lambs, year in and year out, and they still look pretty good don't they?

"Our worm program is to start feeding salt and phenothiazine, a nine to one mixture, in April. In May we drench. I dose with bluestone — copper sulphate — and Black Leaf Forty because I use phenothiazine all summer. What the phenothiazine doesn't get the drench should. I drench the ewes again in October.

"The lambs don't need to be drenched until the middle of June; they hardly ever get any tapes before June. Then I drench these purebreds I have here once a month all summer. You can't feed lambs and worms and expect the lambs to do any good.

"The mixture I use is one ounce of bluestone and one ounce of Black Leaf Forty to three quarts of water. Small lambs get about one ounce; the bigger lambs get two to two and a half ounces."

The two students who are assigned to work with the old master came into the barn about this time to start the evening feeding. The little shepherd allowed it was about time for him to be giving his charges a little personal attention, and Bob Stanley took his leave with a headful of ideas.

ONE BULL=100,000 calves

(*Continued from page* 42)

zero showed a small initial decline and then leveled out.

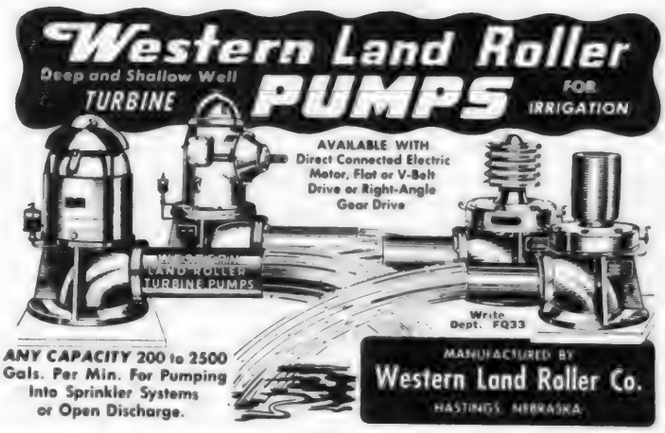
These facts present a problem for the artificial breeding organizations. The semen must be kept at 110 degrees below zero or colder at all times—right up to the moment of thawing and inseminating. This means that the inseminator technicians must have refrigeration equipment that makes the normal farm deep-freezer seem cozy and warm. Some associations are solving this by setting up large dry-ice refrigerators at central points where several technicians can use them as storage banks and go to them daily to fill their dry-ice packed carrying-boxes. Other organizations have smaller boxes, big enough to hold a two-week supply, for each technician. Also on the market are electric refrigerators capable of holding the stored semen at temperatures down to 150 below zero. Equipment of this sort is filling a

pressing need both for large central storage units and for smaller, area banks.

One of the newest carrying-boxes for technicians was invented by Max Drake and his associates at Northern Ohio Breeders Association. This small, white box is capable of holding enough tubes of frozen semen (40) for a full day's work. The box is made by placing beads of polysterne plastic in a mold and exploding them with live steam. The enormously expanding beads fill in the mold, forming a seamless plastic box. A molded lid is made the same way. The box has such marvelous insulating qualities that when one is filled with dry-ice and alcohol and placed beside an empty box, it is impossible to tell by feeling the inch-and-a-half thick walls of the boxes which of the two has an inside temperature of 110 degrees below zero. These inexpensive boxes hold this temperature for a cost of 10 cents a day for dry-ice.

The technician begins his day by filling his cold box with enough semen to last him the day. From the calls he has scheduled he knows the breed of the bulls that will be wanted; and, since the farmers have learned that they can select any bull in the stud, he may have calls for semen from specific bulls.

Some technicians thaw the ampule of semen by dropping it into a glass of cool water; it takes about two minutes for the semen to become liquid and usable. Other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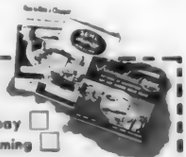

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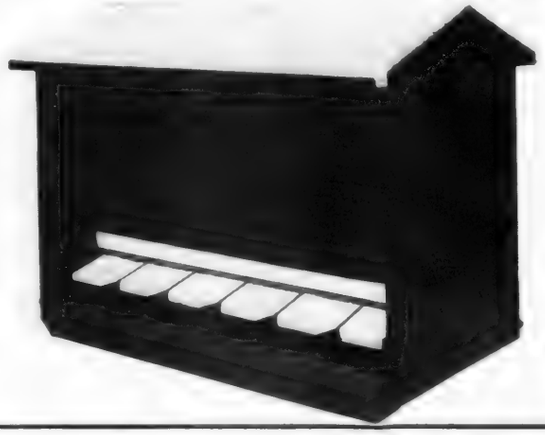

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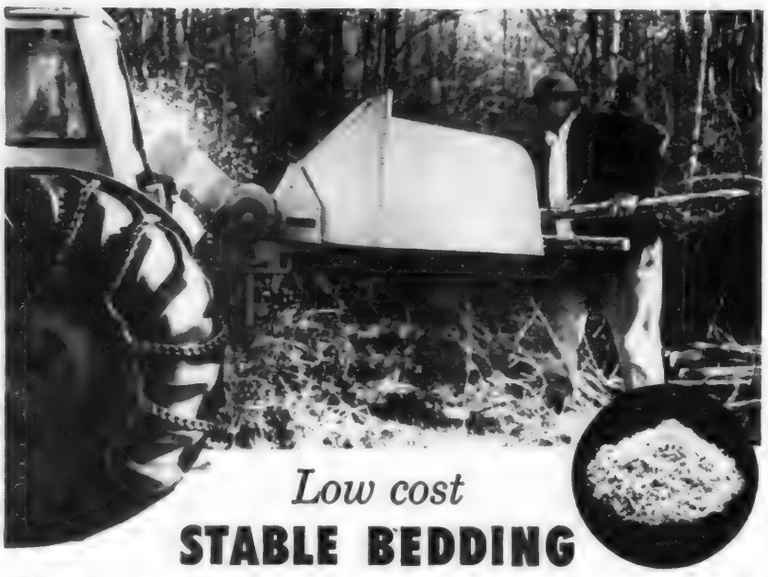

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technicians thaw the semen by holding the ampule in their hands—tossing it from hand to hand until it is warm enough to hold without danger of burning. This system takes about three to four minutes to liquify the semen. One technician even thaws the ampule in his mouth after it has passed the burning cold stage. After a careful comparison of different thawing methods, one artificial breeding organization found that their highest conception rates came from those technicians who were thawing the ampules in ice water. It took longer, five minutes, but it was so much better that all their technicians are now using this system.

Insemination is performed much the same as with the ordinary liquid semen. Both glass and plastic containers are in use. With the new plastic containers, the end is nipped off and the inseminating tube fitted into the neck of the vial; the container becomes the bulb to squeeze the semen through the tube. With the glass ampules, the end is filed off and the inseminating tube dipped in and the semen drawn up by the vacuum created by a removable bulb at the other end.

In order to guide the inseminating tube directly into the uterus, the technician inserts his hand and arm, gloved to the shoulder, into the rectum, and, through the pliable rectum walls, he is able to feel the inseminating tube which he has inserted into the vagina with his right hand and thread it into the entrance to the uterus. With the inseminating tube in the mouth of the uterus, the bulb is squeezed and 10 million living sperm are squirted in. From there, through their own motion and through muscular contractions of the uterus, one of them reaches and fertilizes the egg. One only of the 10 million need reach and penetrate the egg.

Does one of them always reach the egg? Not always with frozen semen or liquid semen or by natural service. However, split ejaculation tests, in which one half of the semen is frozen, the other half used as fresh semen, show that the frozen semen has as high a rate of conception as does the liquid semen and, contrary to popular belief, artificial insemination has a rate of conception which is quite comparable to natural service.

The importance of placement of the sperm is pointed up when it is realized that in natural service 1,000 times as many

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sperm, from 5 to 10 billion, enter the race to fertilize the egg.

What is it which makes a difference in conception rates? Some of the reasons seem almost metaphysical. We feel that when man takes over a natural function he is bound to bungle it in many subtle ways. Dr. VanDemark has shown that fear and contentment play a part here: fear inhibits the muscular contractions within the uterus of the cow which help move the sperm to the egg. He has also shown that mistreating male animals will tend to interfere with their production of sperm. These findings lead us to believe that the attitude and personality of the inseminator technician may have an influence on the rates of conception of the cows he services. His technique in handling the job is also, of course, very important—the conception rates on the record of every new inseminator improve as he gains experience. And finally, the management of the farmer who owns the cow must be considered. He has the lifelong handling of the animal. If her general handling is rough, if her physical condition is poor, or if insemination does not take place during the latter part of the heat period, conception rates will suffer whether service is by artificial insemination or natural.

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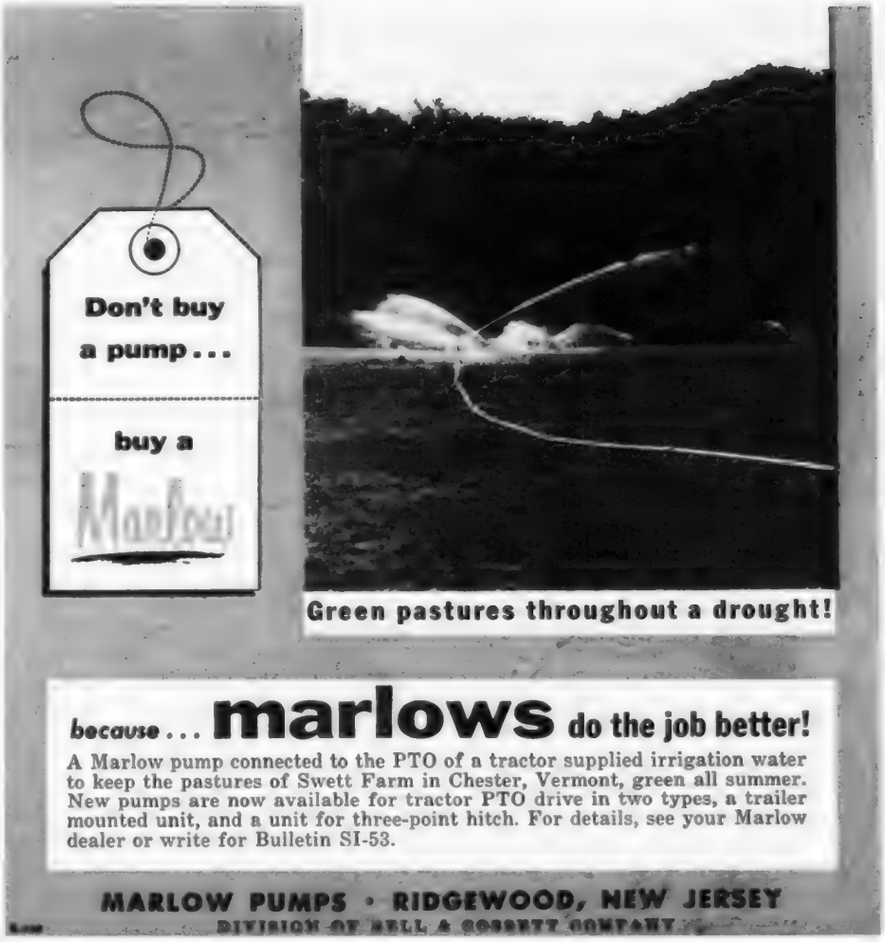
This ability to dilute the sperm and still get good conception rates is reducing the number of bulls we need and, at the same time, making the quality of each bull much more important. In 1935, we felt a bull did all right if he produced 40 calves in a year. In 1945, with artificial insemination, he could sire 1,500. In 1955, on a full scale frozen semen program, a bull can produce anywhere from 15,000 to 100,000 each year. In other words, under artificial insemination a good bull had 38 times the effect in improving the herd as did a good bull used naturally; and with frozen semen he has 2,500 times the effect. The artificial insemination people like to speak of this, but the thing that keeps them awake at night is that they know that a poor bull can do proportionally as much damage.

Each advance has made the need for



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excellent, proven bulls more critical. And each advance, ironically, has narrowed the field from which to make a choice. In the early days of artificial insemination, bull rings were running in practically every dairy area. Every association had a number of rings to look over and select bulls from—bulls with producing daughters. Once the artificial insemination studs were operating, the bull rings died out, leaving only the purebred breeders as a source of supply for the studs.

The purebred breeders are doing an excellent job of producing the kind of bulls which are needed to improve the dairy herds of America. There are, however, factors which make it difficult for a stud to evaluate a proven sire. The first is that practically all of the daughters which are under test to prove the bull are in herds where the environment is far above the average. It is difficult to establish how much of the daughter's performance can be credited to the bull and how much to the continually improving environment which gives her a better chance than her dam. A second factor is that in proving some bulls not every daughter he sires is taken into consideration in making the proof. If the proof is based upon a select few of his daughters, the stud cannot know whether it is the bull which is doing a splendid job or whether it is the heritage of a few excellent dams.

More important is the fact that proof of the bull is often based on his performance in a single closely bred herd rather than on the random selection of cows he will be used on in artificial work. His proof could be the result of a favorable nick with the cow family or even the result of heterosis.

Some of these same problems exist when the bull is proved through use in the stud. The daughters on which they can get proof are those in herds which are part of the D.H.I.A. These are usually the better herds: so it isn't clear whether improvement is due to good conditions or good dams or good bulls.

Several of the associations are trying a new system of proving bulls. At Northern and Central Ohio Breeders Associations the proving of young bulls is done as follows: For each breed of cattle, a group of around 25 breeders is organized to help in the project. Thus a group of 25 owners of purebred Guernsey herds help the stud prove Guernsey sires. Young bulls are bought on the recommendation of 75 per cent of the men in the project who check the breeding of every available Guernsey bull. When they find a really good one they buy him: the Association pays half the cost and the breeders pay the other half. They try to get a bull around eight months old.

In addition to putting up half the money for the bull, the breeders agree to permit him to be used on their cows. As soon as the bull is ready for service he is bred artificially to 125 to 150 cows and is

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- *42" to 114" Swath*
- *Hydraulic Lift or Drawbar Types*

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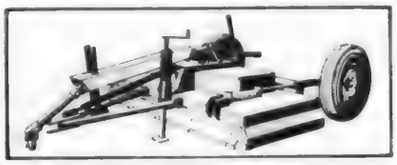

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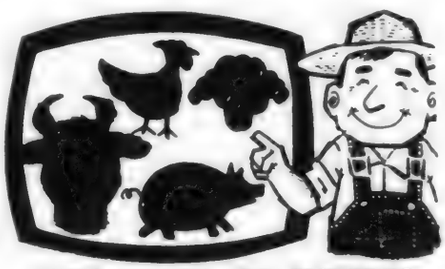

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then retired to await the results of the test. This permits around 50 daughter-dam comparisons in 25 different herds and a random sampling of cows before the bull is five years old. It also gives them a proof on three or four bulls tested in the same herds at the same period so that environmental conditions are the same for each proof. When he reaches five, he is evaluated by the stud management and the breeders. He may be discarded immediately, held for further proof, or be accepted. In any event, the Association pays the breeders back the half of the money they invested in the bull and he then becomes the property of the Association to sell to the butcher or to keep. As soon as storage space becomes available, the Association will be able to backlog a bank of semen on these young bulls during their retirement period to protect themselves in case of loss of the young bull or to have available in case he proves an outstanding sire.

Not only has artificial insemination intensified the search for great bulls, it has also made the best bulls in the world available to 'most any dairyman who is willing to pay the price for their semen. Bull studs are banding together to form larger distributing organizations with national coverage. United Breeders Association, a national distributing organization, was formed by Eastern Iowa Breeders Association, Northern Ohio Breeders Association, and Central Ohio Breeders Association to make the bulls of each association available to all of their members and to market the semen to dairymen over the world. They will be in a position to import semen for any of their members from any bull anywhere in the world where artificial insemination and semen freezing are practiced.

Some of the owners of outstanding bulls are having technicians from the Associations come to their farms, collect semen from the bull, freeze it, and store it for them. In this way they are insuring themselves against the death of the bull. The usual charge for this service is an hourly rate charge for the time of the technician,

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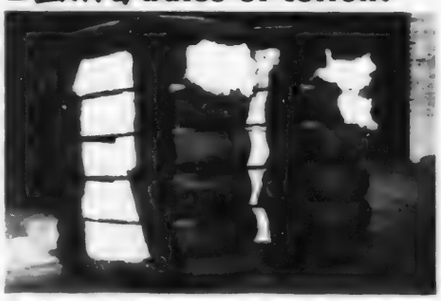
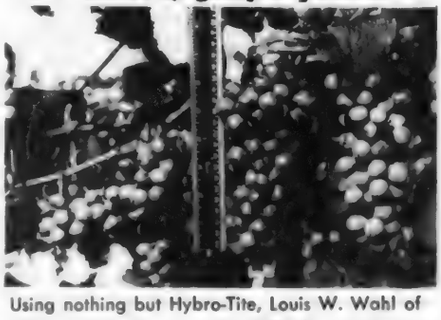
2 *Extra* bales of cotton!



An 8-acre field treated with Hybro-Tite by Lester Stevens, Stilson, Ga., produced **2 bales more cotton** than the same acreage with no Hybro-Tite.

60% *Extra* grape yield!



Using nothing but Hybro-Tite, Louis W. Wahl of Harborcreek, Pa., reports a **60% larger grape yield** in 1954, at a **saving of 44%** over 1953.

And it's the *extras* that are bringing in *repeat orders* for this natural rock soil conditioner, supplying potash and 19 trace minerals.**

Hybro-Tite has helped to boost yields of corn, cotton, rice, vegetables, fruits, berries, peanuts, grains and grasses... helps to improve pastures and bring problem soils into more profitable production. It tends to help crops stand up better during dry weather.

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"Our pastures are magnificent," writes a second-year user in Kentucky. **"Rice yield was 101 bushels per acre,"** says an Arkansas grower. **"Everywhere I used Hybro-Tite I had remarkable results,"** writes a New York grower of vegetables and berries, and adds, **"I plan a complete application on my entire plot."**

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plus a freezing charge of $100, or $1 an ampule if more than 100 ampules are produced. In addition, there is a charge of five cents for each ampule for each month of storage. Both beef and dairy cattle breeders are using this service in order to use their bull on more of their cows and to preserve semen for the future.

Still larger breeders of dairy cattle have gone even further. They are now collecting semen from their bulls, freezing it, and storing it themselves. These farms will be using the semen on their own cows and selling it to other breeders.

The extremely low temperatures at which semen must be stored make it too costly for the average farmer to hold a bank of semen on the farm. Through the privately owned and the cooperative breeding associations, however, he has available a great bank of semen ready for his call. He can plan breeding programs involving specific bulls far in advance and carry them through even though the bull may die in the meantime

For agriculture in general, the frozen semen technique means that better bulls can have an even greater influence on our dairy cattle than they have under artificial insemination with fresh semen. It also means that we must find even better bulls to use and better methods of handling the frozen semen. And while the bull stud management and the technicians are doing this work, the scientists are hard on the trail of even more spectacular ways to store semen. What does the future hold? Several scientists are attempting to find ways to dehydrate the sperm without killing it so that semen could be held as a dry powder without refrigeration.

Another interesting probability of frozen semen is its effect on foreign livestock importations. Our import laws on livestock are involved and cumbersome, preventing the easy movement of breeding stock between this country and foreign countries. These laws will likely be revised to permit the easy exchange of semen.

TEXAS NETTIE WEST

(*Continued from page* 39)

took her to either Rotan or Hamlin, where she did her shopping and banking. Mrs. Bates looked in on her a couple of times a week. They are a mile away, her closest neighbors. They brought her mail from the highway, four miles away, and left it in a box at the end of the lane. Sometimes Nettie walked out to meet them.

That was about all the people Nettie saw, from one year end to the next—until the oil came. "One day a dude came to my door, wearing a tie," she says. Nettie doesn't trust people who wear ties. She put one hand on the shotgun, opened the door with the other. He wanted to lease her half section—said they would

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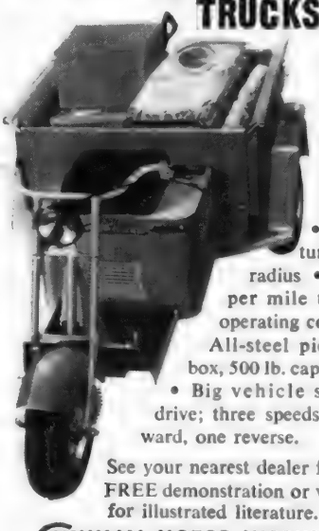

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drill. Nettie went to the Bates, and she talked to her bankers. She was finally convinced that everything was legal and fair.

Then she heard the heavy trucks rolling to the drill site, heard the shouts of men and the clank of machinery. Sometimes the men came to the house. "They were real nice men," Nettie says. "Talked nice and didn't pry into my business. We got along fine."

The well came in in 1953—the best well in the Round Top field. She began to get mail—a check from the oil company regular and on time every month. Neighbors guess she might get $10 a day, maybe as much as $100—Nettie won't tell.

Other men came, seeking royalties on her acres. Nettie slammed the door on them. "They pestered me to death," she says. "I finally had to give it—sold some royalty just to get rid of them." Last year another well came in—not very good. "It soon petered out," Nettie says. "But they'll put down another one pretty soon."

Nettie goes to town once a week with the Bates, as always. She banks her checks, does her shopping—snuff, kerosene, black-eyed peas, salt pork, coffee. She doesn't need much—a dollar or two does her for the week.

Nettie has six nieces and three nephews. A long time ago some of these kinfolk sued Nettie—they thought they ought to have a slice of the half section. Nettie beat them in court, but she hasn't forgotten. She intimates that when her old age is provided for she will remember a Waco niece who took no part in the suit.

"Yes," she says, "I could move to town. But you couldn't get me to live in town if you gave me a house and lot. People always snooping in your business in town. I could bring in the electric, too, but that would cost a lot. I've got to save up for my old age—can't spend high wide and handsome just because I got a little in the bank. Little enough it is, too—the income tax don't leave me hardly anything."

Tankmobile takes compressed air anywhere

Buying a *Tankmobile* is like hiring another hand. It's a portable service station for the farm that makes tire inflation and lubrication jobs easier. Spray paint easier, faster and better than with brush. Single cylinder Compressor built for heavy duty delivers up to 100 psi. Stainless steel tank. Rubber tired wheels. Gasoline engine or electric motor. Safest and most portable air compressor on the market. Nationally known for trouble-free lifetime performance. See the Complete Line of Campbell-Hausfeld Compressor Outfits at your dealers or write 181 Railroad Avenue, Harrison, Ohio.

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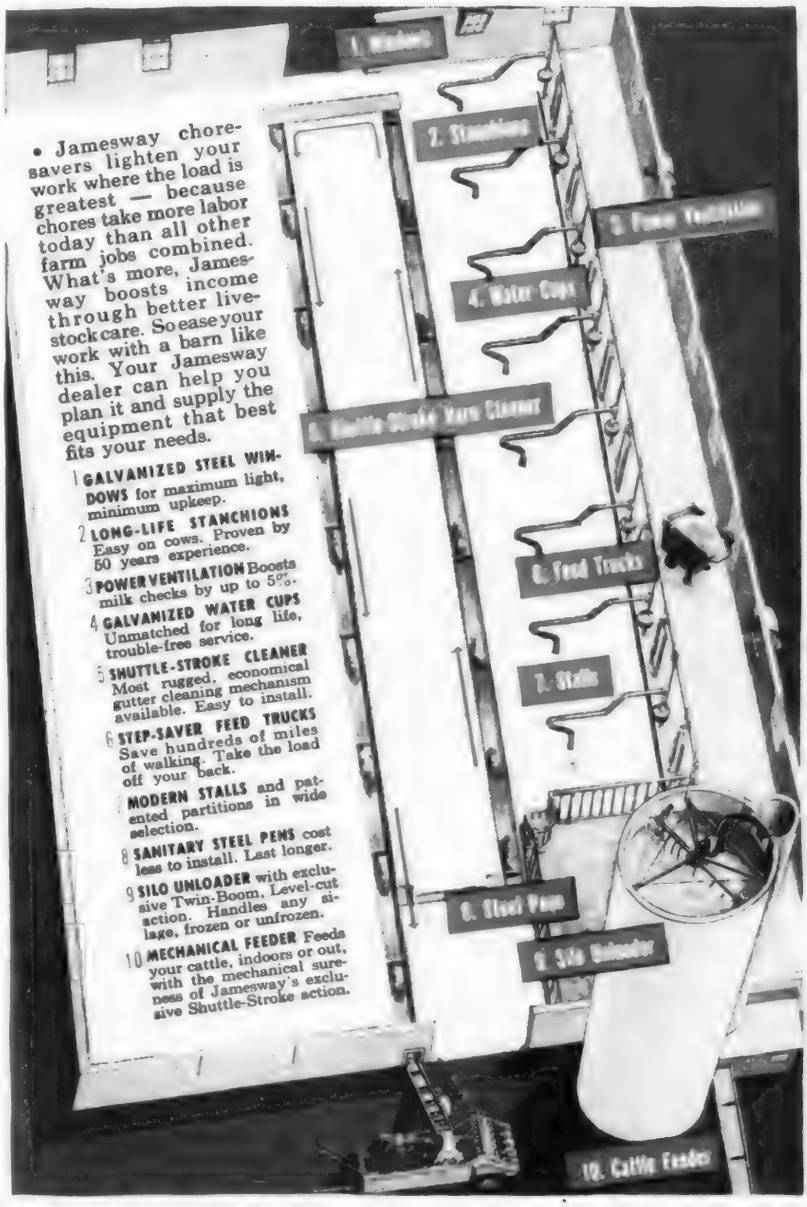

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• Special Hot-Dip galvanizing protects Jamesway equipment from corrosive barn fumes, moisture and hard knocks — provides a coating that is up to 30 times heavier than a normal application of aluminum paint.

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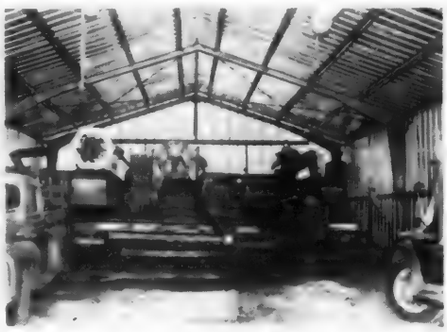

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FARM PUMPS

(*Continued from page* 32)

volume drops sharply. A so-called 600 gallon centrifugal pump might deliver that amount per hour from a 5 foot suction lift and against a 20 pound pressure. But increase the suction lift to 15 feet and you might get only 400 gallons an hour. The same pump might deliver as little as 200 gallons per hour at a pressure of 40 pounds.

Pistons Push Water

Piston pumps, also called plunger or reciprocating pumps, are the best known of the displacement type. They can easily be recognized in shallow well installations by the belt and pulley arrangement used to slow down motor speed and step up power. Through a crankshaft, circular motion is converted to give back and forth motion to a piston working in a water-tight cylinder. On the forward stroke of the piston, a vacuum is created. Atmospheric pressure opens an inlet valve and forces water up the suction pipe from a well into the cylinder. At the end of the piston stroke, the cylinder is full of water: an outlet valve then opens and the backward stroke of the piston pushes the water through the outlet valve to the discharge pipe. Very few pumps on the market are of this single acting type. Most of them are of the double acting type, which deliver water on both directions of the piston's stroke through a double set of valves, giving almost double capacity and a smoother flow of water. An air dome mounted on such pumps cushions the stroke and minimizes pulsations.

The pistons of these shallow well pumps work horizontally. If the motor and crankshaft part could be mounted above a well, with the piston and cylinder detached and remounted at the bottom of the pipe descending into the well, all you have to do is add a long shaft for a piston rod, and a deep well piston pump results. The piston

in this case is made to work up and down, under water.

Deep well pumps of this type must be of heavy construction. They are often gear driven. The motor and the motion-converting device, called a pump head, are above ground. The cylinder or working barrel is under water near the bottom of the well. A long pipe connects cylinder and pump head. This "drop pipe" conducts the water upward and also serves as a sleeve for a long, sectional wood or steel shaft which acts as a piston rod, raising or lowering a plunger inside the cylinder itself.

In single acting types, an intake valve at the bottom of the cylinder opens from pressure of the surrounding water on the first up stroke. With the cylinder filled, the bottom valve closes. On the down stroke, the water in the cylinder is forced through a valve in the piston itself. Each succeeding cylinder full of water is pushed up the drop pipe in a column. Because the weight of the column of water plus the weight of the pump rod must be lifted with each stroke of the piston, deep well pumps require large motors when pumping from great depths. Bringing water up from 1000 feet underground is not uncommon for such pumps.

A bad feature of deep well piston pumps is that they must be placed directly over the well, so the pump rod may operate. This calls for frost-proof housing in a pit or pumphouse, with provision for removing the rod through a roof hatch when making repairs.

Repairs to all models, deep and shallow well, can be made by the average handyman. Trouble shooting usually consists only of replacing plunger leathers, drive belts or packing. Most such pumps require occasional oiling.

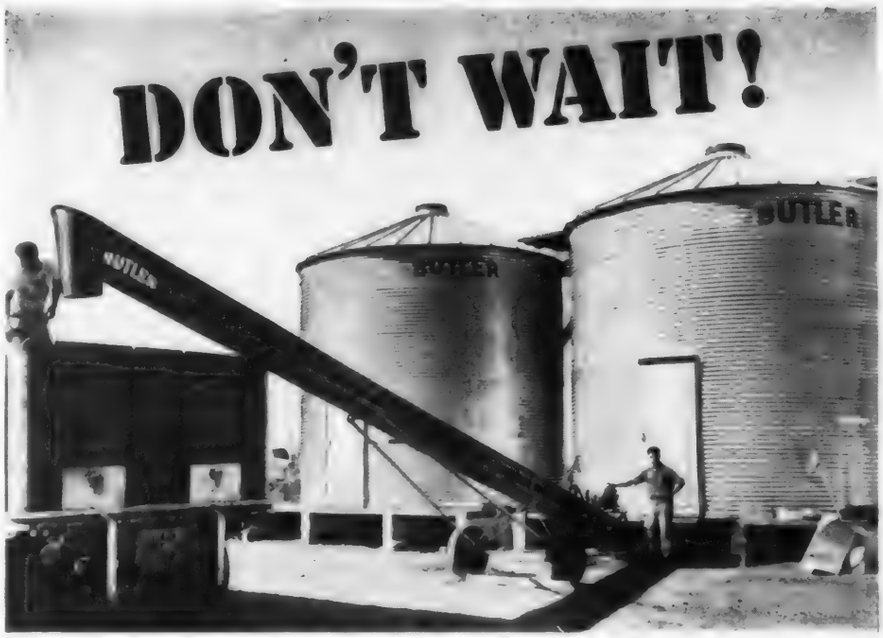
An advantage of piston pumps is their ability to pump water containing sand or silt, though pump life is reduced. A disadvantage of these pumps is their tendency to vibrate and to become noisy with wear.

Rotary Pumps Scoop Water

The once popular rotary gear pumps, while important in industry for moving oil and other heavy liquids, have lost favor in present day farm water systems. They are restricted to shallow well use, preferably to pumping clean cistern water, since the gears give trouble when pumping water containing sand and grit. They move water by displacement.

Original cost is low, for the construction is simple. A small horsepower motor, through a direct-drive shaft, turns twin gears within a housing. As the gears turn, a suction is created at an inlet below them. The revolving teeth scoop and swirl the water outward and upward to a port at the top of the housing. As the teeth mesh again, they prevent the water from recirculating.

Gear pumps develop high pressures. The biggest complaint against them is their



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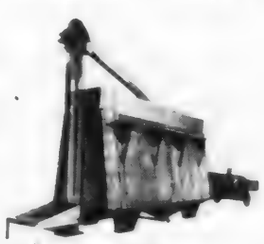

New Butler Batch Bin is used with Butler Crop Dryer. Available in 300 and 600-bushel sizes.

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Quick Facts on Pump Use

Type of Pump	Highest Well Lift	Gallons Per Hour	Discharge Pressures	Initial Priming Needed	Pump and Motor Location
Shallow Well Piston	22 feet	250 up	High	Yes	Over or off well
Deep Well Piston	1,000 feet	200 up	High	No	Over well only
Rotary Gear	22 feet	250 up	High	Yes	Over or off well
Shallow Well Screw	20 feet	275 up	Medium	Yes	Over or off well
Deep Well Screw	900 feet	600 up	Medium	No	Over well only
Straight Centrifugal (single stage)	15 feet	50 up	Low	Yes	Near source
Straight Centrifugal (multi-stage)	20 feet	600 up	High	Yes	Over or off well
Shallow Well Cent. Jet (single stage)	20 feet	200 up	Medium	Yes	Over or off well
Deep Well Cent. Jet (single stage)	300 feet	400 up	Medium	Yes	Over or off well
Deep Well Cent. Jet (multi-stage)	300 feet	200 up	Selective	Yes	Over or off well
Shallow Well Turbine	15 feet	100 up	Medium	Yes	Near source
Deep Well Turbine	1000 feet	900 up	Selective	No	Over well only
Submersibles	2,400 feet	300 up	Selective	No	Inside well

frequent gear trouble. A few grains of sand can stop them cold. Gritty water wears the gears rapidly. If the source of water runs dry, the gears can burn out, since they depend on the liquid being pumped for lubrication.

Screw Pumps Squeeze Water

The right name for a unit of this kind is a helical rotor pump. It is an adaptation of a foreign patent. Displacement is positive as with piston and rotary gear pumps; in other words, the pressure may change, but the capacity remains the same. Within manufacturers' limitations, any increased pressure wanted can be had by using a larger motor on the same pump.

The pumping element consists of a metal shaft called a rotor which has wide, rounded threads on its length. This turns inside a hard rubber tube, the stator, which has a double thread. Water is squeezed upward, taking the course of the red lines on a barber pole. A minor amount of sand can pass through the pump without doing any harm.

Shallow well models of the screw type are usually rated for 20 foot maximum suction lifts. They use small motors, reducing cost and maintenance. Motors as little as one-sixth horsepower develop satisfactory pressures and give capacities up to 275 gallons per hour. Quarter horsepower models deliver up to 430 gallons per hour.

As with piston pumps, deep well screw type pumps must be placed directly over a well. The above ground motor and pumphead turn a shaft within a pipe descending to a rotor and stator deep in the well. Well casings must be of four inch or larger diameter and wells must be free flowing, for these deep well pumps are rated for 600 gallon per hour minimum capacity, in wells to 900 foot depths. Running them dry can cause the rotor to freeze in the stator; then you've got a job on your hands.

The deep well models are adaptable to varying suction lifts without changing the pump itself. Where water tables decline, extra lengths of pipe, shaft and bearings can be added to let the rotor-stator unit farther down in the well, with the expectancy that the same motor and pump will deliver almost as much water.

Centrifugal Pumps Throw Water

If your layout calls for water to be pumped through long pipes or to high elevations, as to a distant barn, requiring pressures over 50 pounds to offset friction loss, a displacement pump is usually best. If you need lots of water fast and at low pressures, a single stage centrifugal pump will give economical service.

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In all four kinds of centrifugal pumps, straight centrifugal, turbine, jet or submersible, capacity goes down as pressure goes up. In low pressure ranges, this may be no disadvantage. When higher pressures are needed, the original cost or operating expense of a centrifugal pump might be considerably more than a displacement pump delivering the same amount of water.

Centrifugal pumps are direct shaft driven. No valves are used. No oiling is necessary. There are very few bearings to wear out and very little can go wrong with them.

In essence, a centrifugal pump is like a child's pinwheel revolving inside a box. The impeller, like a pinwheel, is the only moving part. Impellers are of varied design, being flat discs with enclosed vanes radiating from the center, or having raised and curved wings like the cutters of a hand sausage grinder. Rotating at high speed, they hurl water by centrifugal force.

In straight centrifugal pumps, the impeller, driven by a motor shaft. is enclosed on center in a case shaped like a curled snail, the gradually expanding channel of which opens to a large discharge port. Water enters the impeller at its center and in being thrown outward, creates a vacuum to draw in more water. The widening, snail-shaped case serves to slow down the water, changing speed to pressure. The relationship of impeller speed and design to the shape of the housing case determines the pressure the pump will develop.

Turbine type centrifugal pumps have impellers that look like gears with teeth on their flat side. In these pumps, the housing case is round, and water enters at the side. The impeller teeth are so designed that the water is diffused, or sort of bounced in and out among them, developing much greater pressure as it circles around the case toward an outlet port.

Both the straight centrifugal and turbine types of pumps are usually limited to suction lifts of 15 feet, with greatest efficiency at about 8 feet. For farm use, they are seldom made to produce pressures over 40 pounds. These factors limit their use to situations where a lot of water is wanted quickly, but at pressures below 40 pounds, as in filling stock water tanks through an open hose. Most lightweight, portable utility pumps, for general outside

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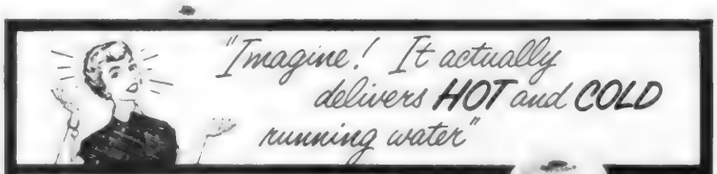

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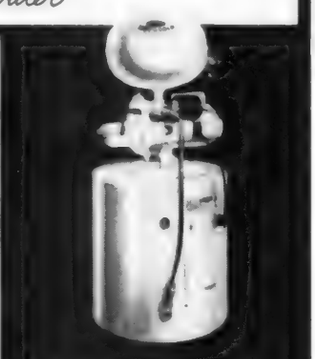

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farm purposes, are of the straight centrifugal type. However, they do come in household water system units, generally in a price range for economy installations where you get what you pay for.

These pumps, as such, have no deep well possibilities. They cannot compete with shallow well displacement pumps in suction lift or pressure range. Engineers have solved those limitations in a number of interesting ways. Jet pumps are one answer. Adding a jet device to a shallow well straight centrifugal pump increases its pressure range and permits suction lifts up to about 20 feet. Some pumps have the jet built into the pump. Others have a detachable jet so that the pump may be converted to deep well use if water tables recede or if the pump is moved to another location.

The Little Giant

The simple appearance of a jet, or ejector, can fool you. A jet doesn't seem like much more than two garden hose nozzles, tip to tip. But in operation a jet is not short of ingenious. The principle involved is best explained in a deep well illustration.

A straight centrifugal pump is mounted at the surface, above the well or at any reasonable distance. Two pipes lead from the pump to the jet, which may be as deep as 300 feet in the well itself. The jet is really a pump, pushing water up to levels within suction range of the shallow well pump above ground.

A garden hose nozzle is a kind of jet. When water comes out the tip, most people believe that the nozzle cuts it down to a fine stream to get high pressure. Actually the nozzle creates high speed water, but the pressure at the tip of the nozzle is reduced to little or nothing. The purpose of the nozzle is to convert pressure to speed.

A jet pump system works the same way. The surface pump forces water down a small pipe deep into the well. There the pipe connects by means of a U bend to the side of a larger pipe, which has a strainer at its base and extends upward to the surface pump. Inside the U bend is the jet, pointing upward. It is only a tapered nozzle. Water enters the base of the jet at high pressure. As in the garden hose, it leaves the tip of the jet at high speed, but low pressure. This creates a

vacuum, sucking more water along with it from the main well pipe. Just above the jet, a passageway, called a venturi tube, tapers in reverse, flaring out toward the top. Its purpose it to reconvert the high-speed, low-pressure stream back to low speed with higher pressure so the mixed water can be pushed up within suction range of the surface pump.

A part of the water is always recirculated. Placing the jet deeper in a well causes more water to circulate in operating the jet. So the deeper the well, the fewer gallons of water per hour delivered to plumbing fixtures by a specific pump. When the jet is placed deeper than 120 feet, efficiency declines, though jets will push water from 300-foot depths.

Two pipe jet systems require well casings of three inches or larger. For two-inch well casings, a single pipe system has been devised, using the well casing itself as a second pipe. This system is efficient only in well casings of very straight, smooth and leak-proof construction.

Above 50 pounds working pressures, jet pumps, shallow and deep well, rapidly drop in efficiency or economy or both. They are available in models producing from about 400 to thousands of gallons per hour.

Jets will handle a little sand, but the seals will fail when there is much abrasion. Badly worn jets won't pump much water. Clogged jets won't pump any. Replacing a jet in a shallow well pump is not difficult, but in a deep well system, the entire piping must be dismantled. Installing a jet system requires good pipe fitting. If plastic pipe is used the job is easy, even for an amateur.

Deep Well Turbines

Impellers of turbine pumps revolve closely within their cases, so don't expect them to handle sandy water, which would wear them out quickly. Where deep wells give a large supply of clean water, upwards of 900 gallons an hour, turbine pumps can bring it up from several hundred feet. As with other shaft-driven deep well pumps, the motor and pumping head must be placed directly over the well.

The shaft turns within the well drop pipe. At the base of shaft and pipe, a series of impellers, each enclosed in a bowl shaped case, are mounted one above the other. Water is sucked up by the lowest

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impeller and passed on to the impeller above it, each impeller adding pressure. If one impeller produces 20 pounds pressure, a series of eight will produce 160 pounds. Deeper well conditions and higher above ground pressure requirements are met by adding impellers and increasing horsepower.

Submersible Pumps

Until recently, deep well pumps were really divided shallow well pumps with part above ground and part under water. Now engineers have dropped the whole works in the water. As soon as motors could be made water-cooled, self-lubricating and moisture-proof, submersible pumps were possible.

So far, they come only in sizes for four inch or larger well casings. Outwardly, they look like a couple of pieces of 3½ inch pipe joined at the middle by a strainer screen. The 300 gallon per hour size, the smallest available, is about 30 inches long; the motor, below the screen, is only 4/10's horsepower, but will develop 50 pounds water pressure. The impellers are in the top section.

These units are suspended at the bottom of a well drop pipe, with a waterproof electric cable running to a control box placed anywhere above ground. Irregular, crooked or leaking well casings don't matter and installation is fast. The shafts, bearings and oilings, as well as the noise of other deep well shaft pumps are eliminated along with the need for pump houses or pits. Even the depth limits of jet pumps are overcome, for these submersibles will pump water from 2400 foot levels. Very high pressures are possible depending on motor size. The pumps are not expensive, considering that installation costs, both in labor and piping, are cut to a minimum. There's one fly in the ointment: submersibles are turbine or centrifugal pumps, so no sand, please. And since they are water-cooled, with some models also water-lubricated, they might burn up if the well pumps dry.

Prices

Costs of pumps vary greatly. There are low-priced, light-duty models as well as durable, high capacity models in every type of pump. Package units, including pump, motor, very small pressure tank and all controls, start in the neighborhood of $89.50 for shallow well systems. Where deep well pumps are required to deliver 500 to 600 gallons of water per hour to distant faucets, the cost jumps sharply. Piping and installation charges can easily be double the cost of a pump itself.

Maintenance costs are small. The electric charges amount to one kilowatt hour for each horsepower hour. If a quarter horsepower pump is to be operated four hours a day, it will use a total of one kilowatt hour per day, usually costing around three cents.

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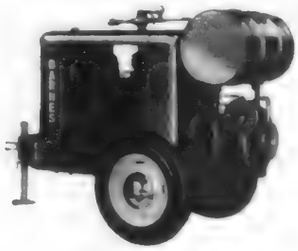

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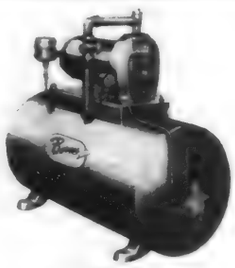

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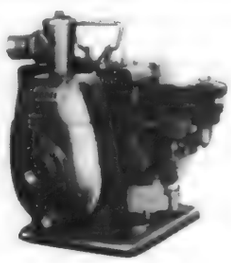

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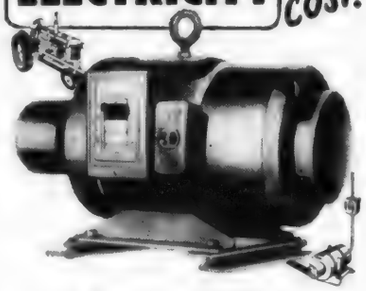

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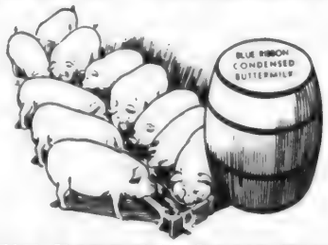

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pressure requirements determine the kind of pump for you. The size of the pump depends on how much water you have available and how much you need. There is no use buying a 500 gallon per hour pump if your well only produces 300 gallons an hour. Any well driller can check your supply by a bailing test. Household water requirements are usually estimated at 50 gallons per person a day for all drinking, cooking, bathing, laundry and toilet purposes. Daily livestock requirements average these quantities:

Each steer or dry cow	12 gal.
Each horse	12 gal.
Each milking cow	35 gal.
Each hog	4 gal.
Each sheep	2 gal.
Each 100 chickens	4 gal.

A pump of sufficient size should be chosen, if supply will permit, to pump the daily total needs within a pumping period of two to four hours. This will prolong pump life and give needed water during peak demands. A pump which is rated at 300 gallons per hour will deliver that amount of water to one faucet only. The average shower bath alone takes five gallons per minute, which is the full capacity of a 300 gallon per hour pump. If another faucet is turned on at the same time, both the shower and faucet may only dribble water.

For carefree service, a pressure tank with pressure switch and air volume charger is necessary. The pressure switch is usually set for the pump to kick on when the water pressure drops to 20 pounds; when pressure in the tank reaches 40 pounds, the pump switches off. With an atmosphere air charger only about one-sixth of the water in a tank can be withdrawn before the pump starts reoperating, so the larger the tank, the less strain on the pump and the more water held in storage for electric shutoffs. Pressure tank air chargers are a recent development. They have more than doubled the effective pump capacity. It is wise to buy a good-sized storage tank. The 42-gallon size has proven to be the most popular. Pumps with built-in tanks of a gallon or two can hardly be considered storage tanks; their main purpose is to smooth out water flow in the manner of an airdome.

The pump should fit the situation. Your well, shallow or deep, your water, sandy or clear, and the pressures and amounts of water you need narrow down the choice of a pump. Planning pays off and puts water when and where you want it.

MECHANICAL PASTURES

(*Continued from page* 67)

the road. Maxfield decided to confine them to a three-acre plot and let his tractors and wagons do the highway crossing.

The young stock are summered on a hill pasture. The 45 to 55 head in milk are green fed three times a day, at 9:00 a. m., 3:00 p. m., and after the night milking, in amounts that can be cleaned up in an hour. A day's feed can be cut from ⅓ to ½ acre. Winter rye is cut first, then clover and alfalfa, followed by green oats and second cutting alfalfa. Sudan grass is clipped in August, legumes once more in fall; sometimes the legumes give a fourth cutting. The same fields provide all the hay and silage required.

Maxfield uses a Helix wagon box with cross conveyor for side delivery unloading at his feed rack. The rack is two feet off the ground, 722 feet long, 4 feet wide, and 8 inches deep. While it takes more time, Maxfield prefers to feed forage cut just prior to each feeding.

"We can get the same amount and nearly the same quality of green feed into them every day," Maxfield says. "Our milk production is more level than it was on pasture.

"The first year we fed slightly wilted forage. We mowed, then raked, and finally loaded the clippings with a pickup head on our harvester. Last year we used a cutter head and the cows liked the feed better. Saves grain, too. We fed the wilted stuff with grain at a 4 to 1 ratio. Now we can use a 5 to 1 ratio."

As an unexpected bonus, bloat has been almost entirely eliminated, though straight legumes are fed. Maxfield considers

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this a direct result of chopping the stems along with the leaves. "A cow has to eat both at the same time. If left to graze, she is likely to gorge herself on leaves alone."

Davis and the Doubters

Two objections against green feeding are often made: (1) There are no holidays with green feeding, and (2) no one but a big operator can afford the equipment. Guy Davis, the Ohio farmer who was forced to expand, doesn't believe these criticisms are valid. He and his sons do the work with one tractor, an inexpensive 40-inch cut harvester and two homemade feedracks on wheels. The portable feedracks are ordinary flat-bed wagons with flared-out six-foot standards to which rough lumber is slatted, boxlike. One of these is just right for a day's feed for the herd. On Saturday, or when they want to do two days at once, they simply haul the two wagon-feeders tandem and fill them both.

Another farmer who has been able to hold down the cost of green feeding is Kenneth Grant, of Potsdam, New York, who feeds around 50 producers and the dry stock on his dairy farm. Grant is out to stretch pasture and to do it as cheaply as possible, so he uses a regular mower to cut the crop and a Booster Buck rake to pick it up and deliver it to the feed lot. This rake will pick up a load of 1500 to 1800 pounds at a crack and unload automatically, so, with four loads morning and night, Grant is able to bring the pasture to the cows without leaving his tractor seat.

Research Is Limited

A test last year at Purdue showed no better gains in fattening cattle from green feeding than from grazing, but the experiment had to be discontinued because of dry weather. Other trials show that green feeding pays in greater production and better feed utilization. More research is needed to prove whether or not it pays when labor and machinery costs are considered.

In a University of California trial, green feeding produced 704 pounds of beef per acre: rotated pasture produced only 417 pounds. Daily gains were about equal. The conclusion was reached that grazing is wasteful of feed through refusal of animals to eat fouled or coarser herbiage. In a trial supervised by Iowa State College, .35 acre provided a full feed of cut roughage per steer from May 15 to September 4. Pastured steers used .86 acre each for the same period. Gains on pasture were 1.50 pounds daily at a cost of 21 cents per pound based on the hay value of the pasture. Greenfed steers gained 1.71 pounds per day at a cost of 14½ cents per pound.

In dairying tests run by Rutgers, milk production in New Jersey held up with far less variation under green feeding than it did with matched cows on pasture.

Mount air compressors, cement mixers, wagon beds or what-have-you . . . build your own "box" trailer and livestock or horse trailer . . . with easy-to-use Hammer Blow running gear. We can furnish—from stock—a wide variety of couplers, jacks, complete axle assemblies and component parts. Get a few short lengths of steel, hook up your arc or gas welding outfit, and *mobilize your farm equipment at a fraction of "finished" cost!*

Or if you'd rather, we can build a complete undercarriage—as shown—to your specifications. Single or tandem axles. Capacities range to 10,000 lbs.

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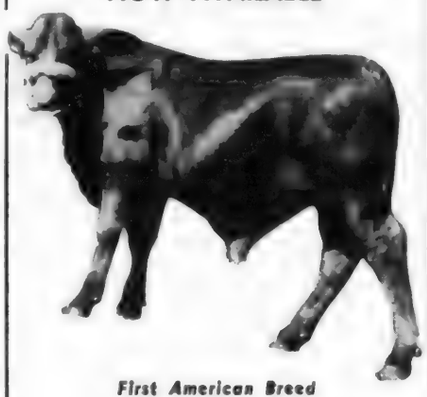

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Grazing wastage was estimated at 20 per cent. At the Minnesota station, milk production under green feeding totaled 2538 pounds per acre against 1525 pounds from grazing, a difference of over 1000 pounds. The daily feeding for 35 head by clipping required .4 acre; by grazing .7 acre.

Gauging Appetites

Cattle seem to eat all clipped standard grasses and legumes with relish. They prefer young growth, as with pasture. Small grain, peas, sorghum, and corn are well liked. Sudan grass is only so-so. However, Sudan and other tall crops, such as oats, are utilized in green feeding without the wastage common when these crops are grazed.

Average daily consumption of clippings depends on the crop fed. At Rutgers University, a combination of sorghum and soybeans produced 19½ tons wet yield per acre, the highest of all the crops in the test, and was consumed at the highest rate, 155 pounds per head per day. Reed canary grass produced the lowest, 3 wet tons per acre, with 35 pounds per head eaten daily. Several farmers report that cows will eat up to 200 pounds a day of grass-legume mixtures. Averages of rotation type pasture plants run from 70 to 90 pounds of green feed eaten.

A Summing Up

Equipment costs are the biggest hurdle to most farmers. The costs are the same whether 20 or 50 cows are being fed. Forage harvesters run from $1000 to $3000. Unloading boxes run from $100 for a false endgate kit up to $2000 for a side delivery box and wagon for quick feeding on the move. However, where a harvester or unloading box are already available on the farm, their use in green feeding will cut their hourly use cost 'way down. One farmer views it this way: "If you put up enough silage to own a forage harvester, you can make green feeding pay."

Green feeding is not adaptable to all situations. It is unsuited to soil with low productive potential. It cannot replace

NEW FOR STOCKMEN — WRITE FOR FREE NASCO CATALOG

Order from this ad on moneyback guarantee. Ask for FREE Catalog of world's largest line of stockmen's and dairymen's supplies . . . hundreds of items you've never seen before to make farming more profitable!

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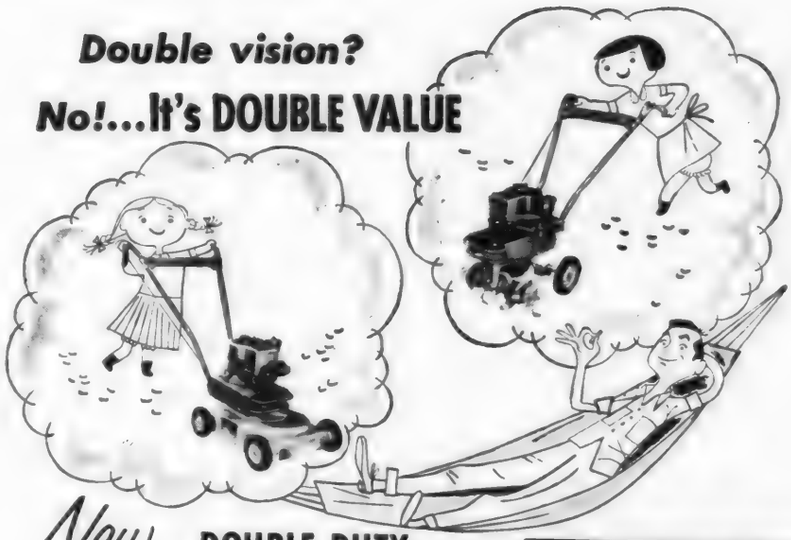

New... **DOUBLE DUTY CHOREMASTER** *Tiller/Mower*

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Save Chore Time... Cut Feeding Costs **½**

★ Unloads at Front Where You Can Watch It

★ Adapts Readily for All Forage Chores, All Silo Filling

Make your forage wagons do more for each dollar invested. Use a Helix side delivery Cross-Conveyor to speed up feeding chores . . . save time. New design feature permits removal of elevator for filling low bunks or working in cramped quarters.

And at silo filling time (either trench or upright) or when hauling chopped hay, you'll find a Helix Rear-End Unloader the most valuable implement on your farm.

One basic machine does both jobs.

Get the Helix unit your farm operation most needs! Or get a Helix All-Steel Forage Box that is ready punched and drilled for 2-Hour conversion to an automatic unloader.

A new manure spreader attachment is also available . . . and for bunk-feeding grains, see the new inexpensive Helix Auger Unloader.

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Now... choose the
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You just can't overload this unloader. Loads loosen as they slide off—use less power. And no unloader will do the job faster! Our exclusive non-spring roller unit increases canvas life 200 to 500%. Recommended for *all size* loads and years and years of trouble-free operation.

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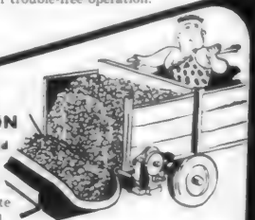
(False End Type)



Comes complete with all fittings. Another inexpensive unloader, the Big Samson handles loads up to 5 tons with ease. It uses the proven Flinchbaugh power unit with adjustable speeds and operates with *any size* motor. Special alloy-steel heat-treated chain pulls false end—lasts the life of the unloader.

SLIP-ON, ROLL-AWAY POWER UNIT

This portable unit consists of the famous Flinchbaugh MEN-E-USES power drive and convenient two-wheel roll-away stand. Gives portable power for 101 other uses on the farm.

NEW!

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MEN-E-SPEEDS CONTROL UNIT

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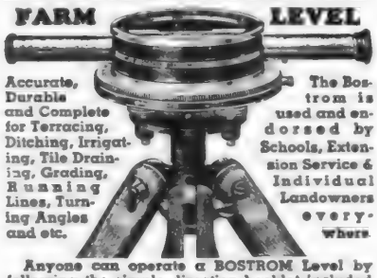

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grazing on untillable or hilly land. It is impractical where labor is limited, and unthrifty where rotations depend on long-lay meadows with over-abundance of roughage that can only be marketed as hay.

On the credit side of the ledger, some of the seldom mentioned advantages of green feeding are hard to rate in dollars. Ease of meadow management, weed control without separate weed mowing, harvesting at best stages of protein and yield and longer lived stands of legumes are by-products of green feeding well worth consideration.

Green feeding, though an ancient practice revived with newer machinery, has already been outmoded by a few farmers. Dwight Coffman (see "Raise Your Own Herd Replacements," page 107) is one of these. After two summers of green feeding, he has branched off into year-round silage feeding. In his opinion, "No more equipment is required: all that is needed is plenty of silage space. There is no cutting in bad weather. We get all the advantages of green feeding without the chore of daily cutting. Silage can be made when a crop is at its best. Most of all, our feed is uniform in quality."

RAISE YOUR OWN HERD REPLACEMENTS

(*Continued from page* 63)

How to Feed

All commercially manufactured milk replacers come with very specific instruction as to how they should be used. For example, the one used at Conner Prairie is recommended for feeding twice a day according to the following schedule:

(Average Calf)
65-95 lbs.

Age	*Milk Replacer	Warm Water
First 2 Days	All colostrum calf will take from cow.	
3–4 Days	Hand feed 4 pints colostrum per feeding.	
5–7 Days	1¼ Tumblers	2½ pints
8th Day thru 5th Week	1½ Tumblers	3½ pints
6th thru 8th Weeks†	2 Tumblers	4½ pints

* Quantities given in four-ounce (¼ lb.) plastic tumblers enclosed in packages.
† If desired to wean early replacer can be fed over grain or pellets in this period instead of liquid-fed.

Like the housewife with a cake recipe, though, few farmers are going to stick to the letter of the manufacturer's directions. Not only does every farmer have his own ideas about feeding, but each calf is as individualistic as its owner and its feed intake must be determined largely by its growth and condition. That is where the artistry of feeding comes in whether it be with calves, cows or herd sires.

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TUXEDO BIG FORTY

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use Tuxedo Porkmaker, the top-quality *complete* feed, for fast, profitable gains. Leading hog raisers know it always pays to feed TUXEDO!

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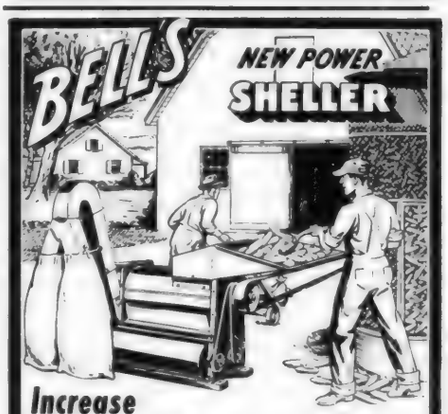

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Manufacturers
HILLSBORO, OHIO

Lemmon says he never gives his calves more than a cup and a half of replacer at a feeding. He supplements the liquid diet with pelleted calf starter fed free choice and gets the calves on hay as soon as they will eat it. After a few weeks, according to the condition of the calf, he adds equal amounts of cracked corn and whole oats to the calf starter but holds this to a maximum intake of six pounds per day. At about two months, the calves are taken off the milk replacer—a calf will just about have used a 25 pound pail in that time—and when they are three to four months old they are switched from their corn, oats, pellets ration to the regular dairy ration which is being fed the dry cows and bulls. This is usually a 12 to 16 per cent protein mixture of bran, oats, molasses, corn, and soybean or linseed oil meal. Again, the calves are held to not more than six pounds a day of this mixture.

Nutritious as they are, milk replacers are still on the doubtful side for raising veal. Some farmers say they will do the job if fed in a more concentrated form than for raising replacement heifers. But the consensus of veal buyers, experiment stations and even the manufacturers themselves seems to be that the replacers are still incapable of doing the work of whole milk in this department. Experiments are now being conducted in which butyrated lard is added to various types of replacers to supply the nutrients required for a complete veal feed. Very interesting progress is being made but no one is yet ready to shout "Eureka."

Even dairymen who rely mostly on whole milk in raising their calves find milk replacers valuable as supplements. Dwight Coffman, Farmersville, Ohio, Holstein breeder, is one of these. Coffman's herd consistently averages better than 18,000 pounds of milk. Last year's butterfat record was 487 pounds. Production like that is maintained only at the expense of drastic culling. Coffman estimates the turnover in his 20-cow herd is about 25 per cent each year, "and buying replacements to match my producers is out of the question," he says. "I have to raise them." Here is his method:

He leaves the calf with its dam only a matter of hours after it is born. Then he puts it in a separate pen bedded down with straw and starts feeding it three pounds of colostrum twice a day. It gets its meals from a pail fitted up with a "Natur Nipple." After the colostrum period he switches to whole milk for four to six weeks, never giving more than four pounds of milk at a feeding. Too much milk, he says, causes scours and it also reduces the amount of hay and grain the calf will consume—and hay and grain are the keystone of the Coffman calf raising system.

Since the calf's rumen is actually, as well as relatively, much smaller than the mature cow's and since it is not provided with the bacteria needed for the digestive process, calves have a hard time with roughage. That is why cud inoculation is suggested—transferring a particle of cud from a mature cow to the calf—and why it is usually recommended that the calves be started out on fresh, leafy legume hay. Coffman rings in a little reverse English on these two ideas. Instead of giving his calves hay direct from the mow, he gives them the stuff left in the rack after the cows have picked over it. "They eat it just as well," he says, "and the cows have left their 'bugs' on it after slobbering over it. That's all the cud inoculation the calves need."

Just as at Conner Prairie Farm, he starts his young heifers out on a mixture of corn, oats, and calf pellets as soon as they will show any interest in it. He leaves the corn in the mixture whole rather than cracked. They get their grain whole until they start passing it undigested, then they are switched to ground dairy feed—corn, oats, soybeans, linseed and cottonseed meal, about a 12 per cent protein blend.

The milk replacer enters the picture when the calves are four to six weeks old. At this point Coffman cuts out the whole milk, substituting about a quarter pound of replacer in a half-gallon of warm water twice a day. This is only about half the strength the manufacturer recommends. This dairyman's object is to maintain the young heifer's appetite for hay and grain. Along with these feeds they are also getting plenty of water, together with salt, bone meal and calcium. The milk substitute

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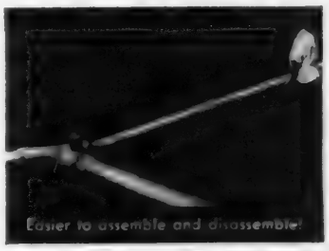

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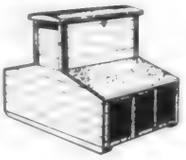

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Hog Fount

Takes the work out of watering hogs. Automatic, trouble-free, no floats, valves or gaskets. Waters 100 hogs. Capacity 85 gallons. Rolls up to fill, down to drink

Also
CHORE-BOY gentle, low vacuum Pipeline Milkers, Parlor Stalls, Releasers, Dairy Farm Equipment.

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Cambridge City, Indiana

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Mix your own cattle, hog, poultry feeds. Get a perfect blend in 10 minutes, save 55c to 80c per 100 lbs. Rugged—easy to operate—absolutely noiseless.

It's just as easy and profitable to make your own poultry litter with a Kelly Duplex Cob Crusher—or to grind grain with a Kelly Duplex Hammermill. Satisfaction guaranteed or your money back. Mail coupon today for full details.

Vertical Mixers — all sizes—small as ½ ton

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is continued until the calves are switched to ground feed on the cue noted above. This is usually somewhere from three to four and a half months, depending entirely upon the reaction of the calf.

Pasture is absolutely out for Coffman's calves. They get their exercise in a barn lot. Pasture, he feels, cuts their appetite for hay and grain, which in turn reduces his control over their growth and condition.

When they are six to eight months old they may get a little silage; again, not so much that it might affect their hay and grain intake adversely. The whole idea is to grow them "so they get big and have body capacity for intake to put it in the pail."

None of the heifers are bred until they weigh 1000 to 1100 pounds. This is usually at 18 to 20 months. The results are in Coffman's records for all to see.

Like him, many dairymen are finding that milk replacers are handy supplemental tools in the farmer's kit. Skill in using those tools can mean better stock in the stanchions as well as money in the bank.

20 BAD WEEDS

(*Continued from page* 28)

on the wheels of machinery, and by other strange and unusual agents.

To know how to control weeds, one must be able to identify them by sight and know something about how they grow. There are three main classes of weeds: annuals, biennials, and perennials. Annuals grow only from seeds—prevent seeds from forming and you have these licked; a single plant may produce a half-million seeds. The biennials and winter annuals grow from seeds, and/or from plants from the previous season—destroy them before they seed and you have them half licked. Harass their roots for one season and you do the other half of the job of eliminating them. Perennials grow from seeds and spread from underground rhizomes, tubers, bulbs, and rootstocks. The job of eliminating them is often a long and expensive one, for they may sprout from a fragment of root, a seed, or a single undiscovered bulb. The best ways to attack all weeds, perennials included, is by chemical killers, constant and repeated cultivation, clipping, and smothering. Rarely can a weed, especially a perennial, be eliminated by one method alone.

Chemical control of weeds is complex, varied by the season, age and type of weed, and its habitat. The most familiar chemical weed killer is 2,4-D, effective on broad leaf plants. Its derivatives and compounds are sold under various trade names. Others are sodium chlorate and Altacide, which has a chlorate base. These are very effective against Canada thistle,

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Spray livestock, apply fertilizer	Use your Century sprayer to free your *livestock* of insect pests that cut gains and milk production. Spray trees, shrubs, buildings. Apply liquid fertilizers.

Century All-Purpose Boom Sprayer—sprays more without refilling. Simple, quick mounting, fits most tractors. Complete tractor seat control. 14, 21, 28 ft. booms. Adjustable row spacing. Also available in aluminum for nitrogen spraying. Tractor or trailer mounted. Prices start at $143.50.*

Other Century Sprayers	Combination Field and Handgun — covers swath to 50 ft. wide or to one side only. As low as $102.00.* Tractor powered Handgun unit available.

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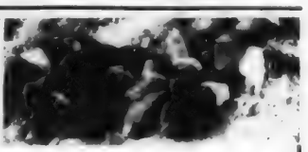
Cedar Rapids, Iowa

FERNDALE FARMS



PURE-BRED HAMPSHIRE HOGS AND ABERDEEN-ANGUS CATTLE

BOARS AND GILTS FOR SALE AT ALL TIMES

Grand Champion carcass at 1954 Ohio Barrow Show was produced and shown by us. Unrelated weanling pigs $100 per pair. Also the 1953 Grand Champion Boar at the Ohio and Indiana State Fairs was owned and exhibited by:

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Arthur B. Evans, Box 50 - - - Cedarville, Ohio
One of the oldest and Largest Herds in America

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One cake of soap does the work of 4 or more!
SEND FOR THIS BOOKLET
With a DIAMOND Water Softener you'll use only ⅓ as much soap. Shorter washing time saves wear on clothes, too. Actually pays for itself!
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quack grass and horse nettle. Ammate, usually applied one pound to a gallon of water, is effective against poison ivy and other woody, tough plants. Sinox is used against broadleaved weeds, such as wild mustard, lamb's quarters and smartweed. Dow General kills all vegetation, and Dow Selective is used for killing broad leaved weeds in crops. 2,4,5-T, a relative of 2,4-D, is more effective on brushy, tough weeds. And T.C.A. is especially effective on quack grass and other perennial grasses. Some weeds succumb after one application, others take several applications plus several years of cultivation. Control can be summed up in five brief items: 1. Plant only thoroughly cleaned seed. 2. Clip pastures, fence rows and waste places frequently enough to catch all weeds throughout the growing season before seeds are formed. 3. Cultivate crops often enough to destroy weed seedlings as they emerge. 4. Use chemicals as a supplementary ally. 5. Smother weeds out with quick growing, fast spreading crops.

A complete list of all weed and brush killing chemicals, with their suggested uses, is given on page 35 of this issue.

LOW COST CORN CRIBS

(*Continued from page* 50)

posts and boards in recent years has given framework almost the same permanency as concrete.

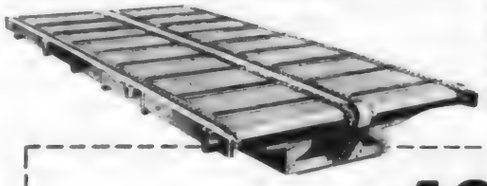
Construction cost on a crib like this is estimated at about $1.35 per square foot at current prices of labor and materials in Indiana. This price is at the upper limit of estimates for pole frame construction because more poles are required to withstand the pressure of the corn. The structure contains 960 square feet, which would make the cost about $1300. With a capacity of 1,000 bushels on each side, this brings the per bushel cost to 65½ cents.

For a more elaborate, very sturdy and serviceable building, there's the Rilco combination corn crib and granary. Ernest Meister of Adams, Minnesota, has one of these, a 27-foot by 32-foot building, with two 7-foot cribs, a 13-foot alley and a granary over the alley. It features a cupola to house the upper end of elevating equipment and to provide increased ventilation and light. Seven men erected all the rafters, joists and bracing in this building in just 6 hours. This structure has a capacity of 4,200 bushels of ear corn and 2980 bushels of small grain. Construction costs are estimate at $1 per bushel of corn and grain capacity, or approximately $7,180.

Forced Air Ventilation

All the cribs presented here are designed to use the natural flow of air for ventilation. But in seasons when the corn is coming in so high in moisture that it cannot

NOW! A SELF-UNLOADING PTO WAGON AT LESS – MUCH LESS COST!



Use This 7 ft. x 14 ft. All-Steel Self-Unloading Platform and Order Cobey Accessories to Best Suit Your Farm Operation.

Platform is Complete with: Steel Floor — 4-Chain Conveyor Unloader — Oil-Bath Gear Box — Complete PTO Shafting.

Mounts on Any Wagon Gear

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OR BUY THE COBEY SELF-UNLOADING WAGON FACTORY BUILT TO FARM SPECIFICATIONS

Complete with Axle Assemblies, Grain Sides, Forage Sides, Bows, Ensilage Tailgate, or Grain-Tight Tailgate.

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Send me details and low price on your self-unloading forage wagon.

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KropKare "PROFIT PACKAGE" FOR CROP DRYING AND STORAGE

Save two ways with KROP-KARE's complete "packaged" drying system. First, because you buy all components at once. Second, because bin or crib, fan or drier, and drying equipment are engineered to work together . . . to do the best drying job most economically. Send coupon for full details.

DRY IT RIGHT . .

Vaneaxial principle of Krop-Kare AIR-TEMP drying fan gives greater air delivery. Adjustable-pitch blades let you dry all types of crops with one fan. Krop-Kare MULTI-TEMP drier uses same fan with heater unit . . . gives more drying air at less cost.

THEN KEEP IT SAFE...

New BLUE BONNET bins and cribs have more protection and labor-saving features than any other similar product. Extra strong construction throughout. 515 to 3315 bu. capacities . . . available with perforated steel floor for drying.

MAKE YOUR OWN MOISTURE TESTS

Inexpensive, portable Krop-Kare moisture tester needs no outside power . . . gives instant readings for corn, grain, hay in storage or field. End danger of mold, overheating.

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Division of KILBY STEEL CO.

Complete line of crop drying, handling and testing equipment . . . crop storage and utility buildings.

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More and more stockers and feeders are proving that green feeding and grass silage gets cattle to market faster at prime weight with greater economy. This improved feeding produces healthier gains and increased milk production. Cattle feed better when they feed themselves this controlled natural way.

Farmers Tom and Bob Hayes, Creston, Iowa write:

"We are really sold on LUNDELL equipment. Our Deluxe Haychopper has paid for itself over and over. Loss due to bloat has been greatly reduced in our herd and feeding costs have been cut greatly. We like the machine's simplicity of design and construction, plus its great many uses."

Farmers Prefer Lundell

LUNDELL forage harvesters hold the answer to fast, profitable forage making. You save time and labor by cutting, shredding and loading in one easy operation. Patented LUNDELL features protect your cattle. Hay is crushed to release gases and reduce bloat danger. LUNDELL forager will not cut wire into deadly short lengths. It will pay you to team up with LUNDELL.

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Lundell MFG. CO.
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MAKES FEEDING, HAULING EASIER

$295 F.O.B. FACTORY Less Tires

For filling feed bunks (either side), upright feeders, grain bins. Excellent for relay from combine or picker sheller to bin, transporting grain to elevator. Spout swivels 360 deg.—use as batch mixer. Also for bulk fertilizer—unload direct into spreader.
Capacity 83.2 bushels. For light weight or bulky feeds or grain 1 ft. extensions can give 100 or more bushel capacity. Sturdy. All steel. 10 gauge frame, heavy gauge V bottom and sides. Complete with rotating shield PTO shaft. Standard 8 ft. auger elevator—front mounted. Extensions can be added to any height for unloading into bins. 15 in. rims.

HELIX CORPORATION
Dept. 2-J, Crown Point, Indiana

Please send me information on new all steel auger box.
Name.....
RR.....
City and State.....

be stored safely, they can all be adapted to forced-air drying. On any of these cribs, except the round model, or an unduly long rectangular crib, the ends can be boarded up to block the air passage, then a large fan placed at the end of one side and an air duct formed with a large canvas along the entire side. The air is forced down the canvas duct and across the crib, passing through the corn.

A more efficient job can be done with an arrangement like the one shown in the diagram on page 50. This plan takes advantage of the fact that a wide shallow crib is better for forced-air ventilation than the conventional type and it shows the possibility of using either a slatted floor or air ducts leading off a central air tunnel to convey the air to the corn. The central air tunnel should be 4 feet high and the corn should be piled to a height of about 8 feet with adequate openings above it for the moist air to be carried away.

It takes a fan with enough punch to deliver 10 cubic feet of air per minute at ½-inch static pressure for every bushel of corn, to do an adequate job of drying. This means a 30-inch fan with a 3-horsepower motor could handle 1,000 bushels. It would take a 30-inch fan powered by a 5-horsepower motor to dry 2,000 bushels.

The ducts should be large enough, too,

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You'll find no way to kill flies more effectively, or easier and cheaper than with Gardner "Insect-o-Cutors"® They operate safely, silently, automatically, around the clock and in all kinds of weather. Placed wherever flies gather, they continually attract and kill flies and other winged insects. They plug into any light socket, cost only a few pennies a day to operate, and will last for years. Thousands are being used by dairy farmers and food plants everywhere. Write today for the full facts and an interesting free folder.

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Horicon, Wis.

to provide at least one square foot of area in cross-section for each 1,000 cubic feet of air per minute put out by the fan. The walls and floor should be tight so the air will be forced upward through the corn; and no attempt should be made to recirculate the air.

The man with a crib-building job on his hands will probably make his final decision as between wood or metal after a balancing of these advantages and disadvantages:

In some sections the cost of timber outruns the cost of pre-fabricated metal buildings.

Termites can shorten the life of any unprotected frame construction.

An unpainted frame crib can become an unsightly thing around the farmstead in a short time. Paint will not only brighten it up but will add years to its life.

Round metal cribs go up in a hurry but are definitely limited in their capacity. When capacity of more than 1,000 to 1,200 bushels is needed it takes more than one crib to do the job.

The round cribs are somewhat more subject to wind damage.

None of the cribs described in this article are of the so-called temporary type. They are all designed to last upward of 12 to 15 years.

LIQUID FERTILIZERS

(*Continued from page* 47)

and fertilizer program, quoting costs.

Senesac operates a one-stop soil service. This is his third year retailing liquid fertilizer. He started with four custom outfits for nitrogen solutions in 1953. It took seven men to service the equipment, transport the liquids and apply the fertilizer on 3,000 acres, mostly for side-dressing corn. Last year he built 25 rigs of his own design which he rented to farmers to spread liquids on 17,000 acres. This year he has 40 rigs out on his Do-It-Yourself system.

One of his customers. Wilbur Hess, tells how the Do-It-Yourself system works. "This spring when I was ready to work up some stubble ground, I called Red for plow down fertilizer. We took the truck into town, had one of Red's 500-gallon

Cattle Loafing, with or without curtain wall
Implement Storage, with or without doors
ARE YOU A FARMER? DAIRYMAN? HERDSMAN?
USF manufactures a complete line of fully prefabricated, all-steel buildings for every rural need. They range from simple open sheds for implements or cattle loafing, to deluxe storage and shelter-feeding arrangements. These are all superior quality, permanent buildings intended for the business-farmer who prides his property and watches his investment.
Combination Feeding and Loafing Barn
Show Barn with Hay Storage
Write for complete descriptive bulletin or specific information.
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UNITED STEEL FABRICATORS, INC.
WOOSTER, OHIO

IT'S A CINCH TO FARM BETTER WITH A DAVIS LOADER
DIGS · DOZES · FILLS · LOADS
Just lift your finger and the hard work is done when you have a Davis Loader. Because it is completely hydraulic you can do countless chores in record time without strain.
HANDLES MANURE, SILAGE, BALED HAY, BUNDLED FEED
It's a tool of 101 uses. This easy-to-attach manure fork, for instance, will more than pay for the loader. A slide-on bottom and sides convert it into an all-purpose utility bucket.
STACKS HAY
The Davis push-off sweeprake stacker attachment handles tremendous loads and stacks out at 21 feet. It's just another example of the utility of the Davis Loader and Davis attachments.
Whatever your loader job is, it will pay you to buy the Davis Loader. It has no equal in quality and performance, and the price is less than you would expect to pay.
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PLEASE SEND ME FREE LITERATURE ON THE DAVIS LOADER TO FIT A _____ TRACTOR.
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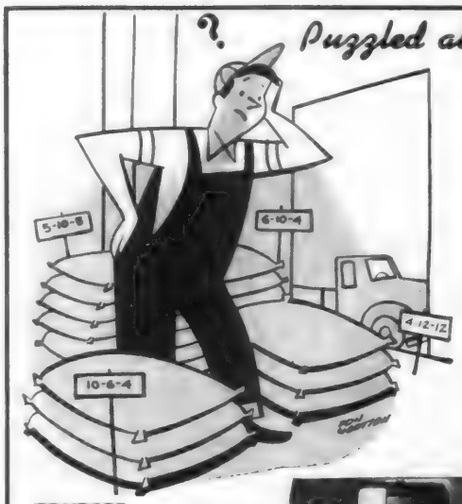

Puzzled about what fertilizer to buy . . . and how much?

TEST YOUR SOIL THE *Simplex* WAY

AND BE SURE THAT YOU HAVE THE CORRECT FERTILIZER AND THE PROPER AMOUNT NEEDED

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SOIL TEST OUTFITS

ARE DESIGNED FOR THE AVERAGE PERSON . . . NO CHEMISTRY KNOWLEDGE REQUIRED

Simplex, the accurate soil tester, gives you an exact fertilizer prescription for your land and an estimate of the increased yield it will bring.

Write today for free catalog and a copy of "The Fable of the Discouraged Farmer."

COMPARE before you buy . . . make sure that the soil tester you purchase can measure in pounds and parts per million the amount of nutrients present in the soil and can enable calculation of the exact fertilizer required . . . and be sure it contains the ammonium test, so essential in determining the total available nitrogen content of the soil.

Commercial Simplex Soil Test Outfits are available in three sizes priced $25.50, $33.50, $49.50, F.O.B. Norwalk, Ohio. Shipped via Railway Express.

The Farm Simplex Soil Test Outfit illustrated is the smallest of the three, yet more complete, more efficient than another make of soil tester and is lower in price.

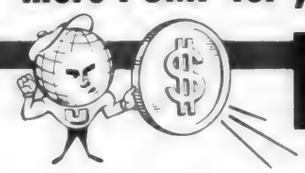
THE EDWARDS LABORATORY • P.O. BOX 318-D • NORWALK, OHIO

more PUMP for your money!

RUGGED NEW

UNIVERSAL

WATER SYSTEMS



MORE WATER than from other pumps of same horsepower. Saves on initial cost. Saves on power bills.

MORE SECURITY with no moving parts or motor below ground to clog on silt or burn out should water level drop.

MORE FREEDOM. Adjusts automatically to changing water levels. Shuts itself off if well gets pumped down. No priming or lubricating needed.

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Results justify the care taken in selecting true strains of seed and in employing the highest standards of nursery culture.

HEAVY ROOTS and STURDY TOPS

Musser seedlings and transplants grow readily on waste land.

With Musser's tremendous volume you are assured of the greatest value. Wholesale prices and planting lists on request.

Grow Xmas Trees for waste land profit

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(POSTPAID, AT PLANTING TIME)

25 EVERGREENS - - - $5.00

Selected 3 to 5 yr. trees, 6" to 16" tall. 5 each of Colorado Blue Spruce — Scotch Pine — Austrian Pine — Norway Spruce — Concolor Fir.

5 BLUE SPRUCE - - - $3.50

Famous Colorado Blue Spruce — excellent 6 year transplants, 8" to 12" tall. Blue-green to marvelous blue. Compact, sturdy, make handsome trees or hedge.

10 RHODODENDRON - $4.00

Single stem to lightly branched, 7" to 12". Fine young plants — will grow bushy. Maximum — Excellent ornamental, Large clusters of gorgeous flowers. Prefer partial shade. Natural "woodsey" effect.

MUSSER FORESTS, INC. BOX 6-F, INDIANA, PA.

tanks loaded on it, then got it pumped full of liquid fertilizer. We hitched the applicator on behind, with its 150-gallon tank also filled. That gave us 650 gallons, over 3 tons, enough for 300 pounds per acre on 20 acres. In the field, the tractor pulled the applicator. To refill the applicator tank from the truck, all that's necessary is to reverse the compressor hose. In about an hour after we started spraying, we had pumped the last of the fertilizer from the truck into the applicator tank. While I took the truck into town for another tankfull, the boy was finishing up the last four or five acres of that 20-acre piece. We didn't strain a muscle."

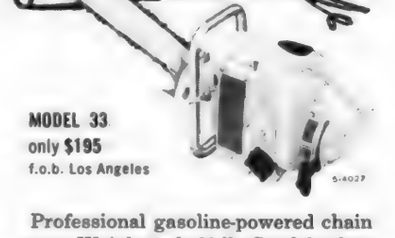
Applying Complete Liquids

In theory, complete liquids are neutral, neither acid or basic, with no corrosion problems. Any tank that will hold water will serve for storage or application. Corrosion begins when tanks are emptied. Scale and rust not only destroy tanks, but clog nozzles as well. It is best to prevent corrosion of equipment by washing with detergents after use. Brass and copper fittings, usually found on weed sprayers, corrode quickly if used for liquid fertilizers.

Complete liquids may be applied by spraying, by injection into the soil, by airplane, or by simply dribbling through a hose with a valve to control the rate of flow. Outfits, as well as parts for assembling them, are available in a wide range of prices.

Farmers are reluctant to invest in lower priced tanks and equipment that will be limited to handling complete liquids. Operators like Dick Cecil of Dayton, Ohio, and farmer-owners who want to side-dress or knife-in nitrogen solutions, which are more corrosive, prefer combination knifer-sprayers which will handle all liquids along with weed and bug sprays. Only stainless steel or aluminum rigs answer all purposes. Hoses can be of neoprene on steel booms, for aluminum booms snap easily. The most adaptable rigs, of trailer type, combine two or four row subsurface

McCULLOCH *Chain Saw*



MODEL 33
only $195
f.o.b. Los Angeles

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Professional gasoline-powered chain saw. Weighs only 20 lb. Send for free literature. McCulloch Motors Corporation, Los Angeles 45, California— *World's largest chain saw builder.*

NEWS! Ask about the McCulloch twin-action farm lawn mower.

blades with detachable or folding 20-foot spray booms. They cost upwards of $750. For spraying only, cheaper units are available, consisting of a tank with an air compressor or pump and booms or boomless nozzles which cover from 20 to 50 feet; they are set on a pick-up truck for transport as well as for field application. Good metering-type applicator pumps, capable of handling corrosive liquids, cost about $300. A new pump unit on the market, costing around $50, employs a reel which squeezes liquid fertilizer through plastic hose, eliminating the need for aluminum impellers. Tanks for storing corrosive liquids like nirtogen solutions must be made of aluminum or stainless steel. A 115-gallon aluminum tank costs $119, a 300-gallon tank $226. A 1000-gallon aluminum nurse tank, with air compressor, valves and hose for transferring liquids, on skids for trailer mounting, costs $1000.

Frugal farmers are converting the equipment they have. This past spring, Alvin Mahrenholz of Lawrenceville, Illinois, put liquid 4-10-10 in the row on 200 acres of corn at the rate of 150 pounds per acre. He says, "The most dry fertilizer my four row planter would carry was 400 pounds. This year I pulled my 150-gallon orchard sprayer behind my mounted planter and spotted the liquid fertilizer over the row. This way I can carry 1500 pounds of liquids, enough to plant 10 acres without stopping."

Some of the manufacturers of farm liquid fertilizer spray equipment are: John Blue Company, Inc., Huntsville, Alabama; Continental Belton, Belton, Texas; The Broyhill Company, Dakota City, Nebraska; Cleland Manufacturing Co., 820 Harding Way West, Galion, Ohio; G. L. F. Soil Building Service, Terrace Hill, Ithaca, New York; General Metals, P.O. Box 448, Greensboro, North Carolina; Ken Standard Corporation, 1401 N. Fares Avenue, Evansville 11, Indiana; Poweraire Sales Company, 2603-2611 Florence Blvd., Omaha 10, Nebraska; Standard Steel Mfg. Co., Inc., 2137 North Sherman Drive, Indianapolis, Indiana; Tryco Manufacturing Co., Inc., P.O. Box 1277, Decatur, Illinois; Dempster Mill Manufacturing Co., Beatrice, Nebraska; Liberty Manufacturing Company, Red Spring, North Carolina; Nutritional Concentrates, Inc., New Lexington, Ohio; Senesac Soil Service, Fowler, Indiana; Tractor Stilts Company, 4126 North 72nd Street, Omaha, Nebraska; Campbell Fertilizer Applicator, Campbell Manufacturing Co., Walthill, Nebraska.

How They Work

Farmers see many advantages in liquids. Here are a few of them:

1. Liquid equipment lasts longer. Less wear and tear, with no moving parts except pump impellers. Easy to change rates of application on home-made spray rigs for non-corrosive liquids. Just put different sized trickle holes in a boom pipe and tape up the ones you don't want to use.

2. No extra hand needed in the field to fill hoppers. No spilling, no bridging over, more even spreading.

3. There is less blowing in windy weather. The operator can control the rate of application closer. Fertilizer can be applied to 160 acres in one long day. The same acreage could take as long as five days with conventional equipment. Fast spreading when squeezed between rainy days helps get crops planted on time. Crops respond quicker, even in dry weather.

4. There is no caking, no clogging and no backache. Liquid fertilizer is not hard on the hands or eyes—at least no more so than table salt in water. There is no need to store liquids; the factory can mix up any analysis on short order.

5. Weeds and bugs can be killed in one trip over the field by mixing compatible insecticide chemicals with fertilizer solutions. Factory-mixed dry fertilizer and insecticide or herbicide combinations are expensive, are unavailable in proportions for specific purposes and lose some of their pest-killing strength in curing.

Each section of the country is meeting its own liquid fertilizer needs. California vegetable growers have developed 50-foot wide nitrogen shooters. They often give truck crops three or four shots of complete liquid fertilizers a season. They are way ahead of the rest of the nation in applying liquids to irrigation and in the direct use of liquid phosphoric acid. Louisiana cane growers apply liquid nitrogen, phosphorus and potash from separate

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with the low-cost

FERTILEZE FLOW MIXER

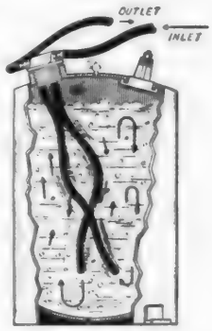
Instant control over pH and soil deficiencies — even in mid-season!

Turn your present sprinkler irrigation system into an efficient, yield-building fertilirrigation unit. The sturdy FLOW MIXER can be attached to any portable or permanent system . . . to provide all-season control over soil pH and mineral deficiencies, as well as weeds, insects and disease.

Operated by powerful *hydra-hose* agitation, the FLOW MIXER thoroughly mixes and applies all soluble and liquid fertilizers, hydrated lime and specific toxic materials. Installation is simple, operation is absolutely fool-proof.

Apply soluble N.C.I. Mineralized Fertilizers with the FLOW MIXER for vital supplemental feeding. Concentrated N.C.I. formulas supply various N-P-K combinations, plus all known essential trace minerals. No matter what early-season fertilizer you've used, complete N.C.I. formulas improve results by restoring food elements commonly depleted by intensive irrigation.

If your crops respond to irrigation, they'll thrive on *fertili*rrigation. Write for the facts!



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TRUE-PROPORTIONING

AGI-SPRAYER

The simple, revolutionary AGI-SPRAYER now permits you to apply liquid and soluble materials *anywhere* . . . to soil, roots and foliage . . . as well as to areas not accessible to other equipment. Even non-soluble materials once considered "unsprayable"—such as hydrated lime and grass seed—can be applied uniformly and economically. Powerful *hydra-hose* action makes the Agi-Sprayer a true proportioner for insecticides and other toxic materials. Three tank sizes available: 100-gal., 500-gal. and 1000-gal. Write for complete specifications.

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☐ I am now using sprinkler irrigation equipment.

☐ DEALERS—Request franchise information.

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CARDINAL "Skipper 20"

BIG 20" TROUGH

A top-performance, top-quality elevator priced low. Offers operating features available in any higher priced elevator.

COMPARE . . . its 20" trough, plus features, low price.

Sturdy steel construction throughout. Trough 20" wide; overall depth 12"; channel depth 5½". Trough lengths, 24', 28', 32', 36', 40' and 44', eight foot or 10' drag feeder or self-powered feeder optional equipment.

CARDINAL "Hyker 18"

A FUNCTIONAL, DURABLE, LOW-COST, PRACTICAL ALL-PURPOSE FARM ELEVATOR

Performance to your needs without costly and fancy gadgetry. Puts corn to the crib, baled hay to mow or stack, small grain to the bin with dependable efficiency.

Trough—16-gauge steel, sectionally constructed. Lengths—16', 20', 24' 28', 32', 36'. Reduction drive provides means for powering by any or all of 4 ways—speed jack, PTO, elec. motor or gas. engine.

CARDINAL Junior

RATED THE BEST ALUMINUM ELEVATOR BUY!

15-gauge alum. alloy; Timken-tapered roller bearings; lengths—8', 12', 16', 20', 22', 24', 26', 28'.

GREATER CAPACITY

Bulk feed capacity is 10 to 20 tons per hour. Used by thousands in handling both bulk feed and litter. Acid-resistant. Easily hosed out for sanitation.

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MOVES THE MOST MATERIAL FOR THE MONEY INVESTED—UP TO 10 BU. PER MINUTE

Tube—4", galvanized Lengths— 8', 12', 16'. Power—gas. eng. or elec. motor. Hopper optional.

● Removable head section ● Self-aligning bearing ● Heavy universal motor mount ● Sturdy swivel bracket for mounting support ● Reliable skid shoe on intake end.

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tanks in any combination desired with portable mixer-applicators. In areas of Illinois, custom application is considered cheaper than owning rigs. In Knox County, Indiana, quantity users get free delivery from a nearby factory. In 1954, 95 per cent of the liquids sold in Knox County were applied by the farmers themselves. In Iowa and elsewhere, companies are setting up plants to convert anhydrous ammonia to aqua ammonia. The process essentially consists of slowly bleeding the ammonia into water. This reduces the N content, but reduces the pressure of anhydrous ammonia and permits the use of less expensive equipment. In parts of the southwest, tractor applicators are provided with detachable legs. When not used on tractors, the outfits are set up on the legs to feed irrigation lines.

IRRIGATION

(*Continued from page* 53)

By moving sprinklers instead of pipe and by mechanizing the pipe moving job when it has to be done, the high pressure irrigators have cut the labor requirements in half. A rule of thumb has been that it takes an hour of labor for each acre on which a two inch application of water is made. High pressure irrigation will halve this and sharp operators like Lesher will reduce it still further with short cuts. Since labor makes up a third of the cost of irrigating, such a saving makes a substantial difference.

There Are Problems

With all of these advantages, why should anyone use any other method? First, we have told only one side of the high pressure story, and second there are limitations on where high pressure can be used. High pressure irrigation has its problems, too.

The first problem is the water absorbing capacity of the soil. If the soil cannot drink in the one-half to an inch per hour of water that is poured on it by high pressure irrigation, then it would not only be wasteful, but downright destructive to use this method. So, the first step in deciding whether or not high pressure irrigation can be used on a farm is to check the soil—not only its water absorbing quality but its slope, since runoff increases in direct proportion with slope. The chart on page 52 gives a description of soils and their capacities at different slopes.

Assuming that the soil is capable of taking high pressure irrigation, there are still other problems which might cause the farmer to choose a lower pressure system. One of the controversial questions is whether or not high pressure irrigation is limited to a particular class of crops. Some irrigation people say, "High pressure irrigation may be all right for pastures, but anyone who recommends it for row crops

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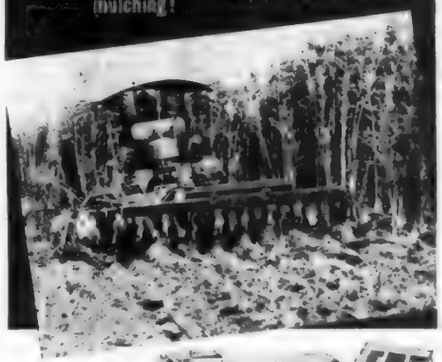

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NEW TOWNER STUBBLE PLOW
tills toughest soils in far less time.

or truck gardening should have his head examined. It will tear up the plants and the soil."

An irrigation expert who has been following sprinkler irrigation from the start, answers, "I have seen high pressure irrigation used successfully and safely on about every crop that is grown. I have seen it used on shade-grown, wrapper-leaf tobacco where the water is above the cheese cloth netting that shades the tobacco and must fall so evenly that it goes right through the cloth without forming sags and concentrating in any one place. I've seen it used on hundreds of acres of mint on the Gehring Farm near Rensselaer, Indiana—and mint is a crop that always gives trouble with lodging.

"When crops are torn up with irrigation water, the fault is usually not high pressure irrigation, but high pressure equipment run at too low a pressure. As pressure is reduced, the stream of water that comes from the nozzle of the sprinkler forms into larger and larger drops. This coarse shower can, of course, damage soil and crops. I suspect that what usually happens is that the farmer runs the equipment at proper pressure for a while and then sees his fuel bill and decides that it won't hurt to cut down on the engine's rpm a little. He gradually sneaks back the throttle until the pressure is down to where the nozzle can't break up the water. If you've ever observed one of those adjustable lawn hose nozzles you'll see what I mean. You close the nozzle down to where there is a very small opening and you get a fine spray, almost a mist: open it up and you get a solid stream. In that case the nozzle changes while the pressure remains constant. With the irrigation nozzle the reverse is true; a high pressure breaks up the stream into droplets no heavier than rain: low pressure makes larger droplets and, if low enough, an unbroken stream."

The fact remains that with this equipment pressure is critical: if pressure is reduced crops will be damaged.

Cost is another factor which must be faced. High pressure equipment often requires a size larger pipe, a more powerful engine, and greater care, if not cost, in selecting couplings which will bear up under high pressure. Also, it uses fewer sprinklers, but they are a good deal more expensive than the low pressure sprinklers.

Since each sprinkler system should be a custom made job to fit the farm, it is impossible to say that the high pressure system always costs 5, 10 or 15 per cent more than low pressure or even that it always cost more. Every special condition such as distance from water source, the grade up which water must be pumped, or the length of rows will change the situation, but on a flat farm with a readily available water supply and 160 acres of corn, beans, and pasture to be irrigated the cost of each system would run something like this: for the high pressure sys-

GOAL: CONTROLLED MOISTURE

Mike Behlen
Vice-President
Behlen Manufacturing Co.
Columbus, Nebraska

No one can say what the total moisture pattern will be for this year. Rainfall may be spotty. Or it may come when your grains and sorghums need it least —at harvest-time.

Of course, everyone knows that irrigation is the way to control lack of moisture in soil. But fairly new is the use of crop driers like the Behlen Grain Drier to control moisture in shell corn and small grains.

This idea of artificial crop drying, however, is catching on fast. Maybe you've read articles by farm editors on how a drier lets you harvest earlier; harvest more; store more safely in less storage space; get a better market price for dried crops; and save manpower by reducing grain handling.

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But if you want to hear some really enthusiastic reports on crop drying, talk to owners of Behlen Grain Driers. Paul Barringer, Ocheyedan, Iowa, volunteered this for our case history file:

"I dried 25,000 bu. of corn for my neighbor. He wanted to pay me 8¢ a bushel, but because he was my neighbor, I cut it down to 5¢. When it turned out that the total bill was $1,250.00, my neighbor suggested he might as well buy the drier. So I sold it to him. I'm buying another Behlen in time for my next corn crop."

Mr. Barringer's second Behlen Drier was delivered to him in September. One feature he especially likes is the fast drying rate.

A Behlen Grain Drier reduces the moisture content of 358 bu. from 25% to 15% in less than 90 minutes with farm tractor drive. And owners report fuel cost of less than 1½¢ per bushel. The Heat Blower generates up to 4,000,000 B.T.U.'s direct heat per hour.

Behlen Grain Driers are available for propane, natural gas or fuel oil. For illustrated folder, write me, Mike Behlen, c/o Behlen Manufacturing Company, Columbus, Nebraska.

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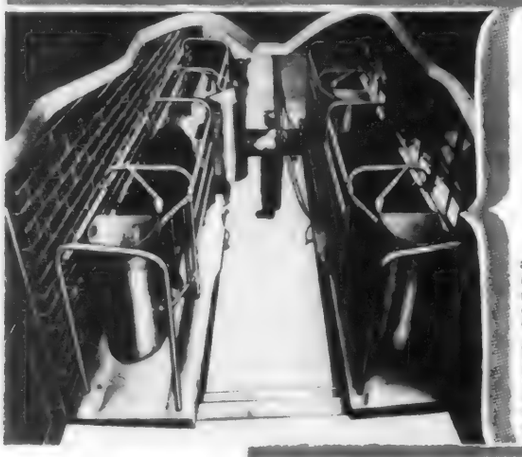

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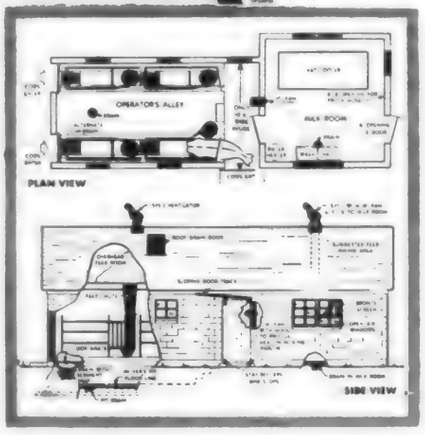

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tem, $9,528 with two laterals or $7,019 with one lateral. The low pressure system would cost $9,293 with two laterals or $6,179 with one. With two laterals, each system is designed to sprinkle two inches of water on 160 acres in around 187 hours of watering. The difference in cost comes from the fact that the high pressure system uses all six-inch pipe while with the low pressure system around a third of the pipe is five inch. With the high pressure system, sprinkler heads will be moved every three hours; with the low pressure system, two laterals will be moved every four and a quarter hours. The high pressure system uses about half the labor required to operate the low pressure system when two laterals are used. With only one lateral in operation, the high pressure system gains a greater labor advantage over the low pressure system because sprinkler heads may be moved on the high pressure system without shutting down the pump, but the whole system must be shut off when the lateral is moved.

Bill Lesher has this to say about the price differential: "My dealer warned me that the system would cost more and that I would burn more fuel, but I went ahead and bought the high pressure equipment. I figure that the extra money I paid for the equipment and for running it is more than made up for by the fact that I can do all of the irrigating myself without hiring an extra man."

High pressure enthusiasts were not, of course, the only ones present when mechanical aptitudes were passed out—the low pressure boys have come up with some labor-saving twists, too. One Nebraska farmer, for example, whose soil won't take high pressure application rates, has beaten the labor problem by lowering the pressure and the water application to *well below* what his soil could easily absorb. He is now able to run his laterals for 12 hours without moving them and without putting on too much water. He uses a good many more laterals, which raised his cost, but he moves them morning and night without interfering with other work and he keeps his system running continuously.

Still another disadvantage which is claimed to go with high pressure is the effect of wind on the pattern of the shower the sprinklers create. In order to get the long throw of water the system makes, the water makes a high arc which gives the wind a greater chance to blow the water out of its pattern. The high pressure advocates say that it hasn't yet been proved that the pattern of the big nozzle is changed more than the combined change of the many smaller nozzles it would take to equal the water output of the big one. All agree, however, that wind will radically change the pattern of any system and that with the high pressure system it is more apparent.

A final argument against high pressure irrigation is that the pipe and sprinklers are heavier to handle and that the pipe must be moved further when it is moved. Some users of the equipment feel that this is an advantage rather than a disadvantage. "I carried those heavy sprinklers through the mud a few times, then I thought of a way to mount them permanently on wheels and rigged up the little tractor to tow them from setting to setting," Lesher says. "As for the heavy pipe, it just calls for mechanical handling. And once you have it loaded on the wagon it doesn't really matter whether you move it sixty feet or a couple of hundred. I'll take that back, it does matter. By moving it two hundred feet you are striding right down the field getting the job done without spending a lot of time on it."

Very high pressure systems are certainly not for every farm, but most farmers can figure that the higher the pressure, within the limits of their soil's capacity to absorb water, the longer the reach of the sprinklers and the lower will be the labor requirements.

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The SKINNER IRRIGATION COMPANY

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MONEY IN QUAIL

(*Continued from page* 71)

cover. Lowrance has found that cedar is the ideal for this purpose. The needles fall through the wire floor and will not lodge and collect droppings as leaves would do. Males and females are segregated to prevent fighting among the males, which seems to be stimulated when females are present. In spite of this, there is considerable feuding. Both the males and females scold each other all day long, threaten and call names. When active hostilities break out and blood is drawn, the injured bird would be quickly pecked to death if not removed. Birds of the same hatch are raised together. Mixing would precipitate a free-for-all.

The growing birds have before them a commercial growing mash at all times. In addition, they get a grain ration two or three times a week, and a helping of greens or fruit, mostly apples. In the fall the hold-over breeding stock gets a bigger proportion of grain. The feed and water containers are filled once a day from a cart. At 16 weeks they are fully grown and are ready to be sold for breeding stock, field trials, or dressed as a table delicacy.

For restocking Lowrance believes that half-grown birds, 7½ to 8 weeks old, are best. He says that July and August are the best months for releasing, for at this time natural cover is at its best, and the half-grown birds are more adaptable to wild

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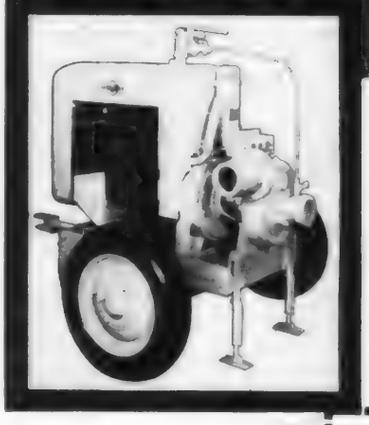

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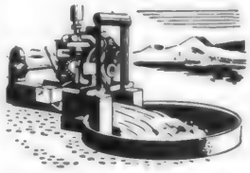

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life. Before shipping, birds for restocking or field trials are placed in flight pens for a few days to develop their wings.

Releasing them is as simple as taking the shipping box to the field and opening the lid. The birds take off in every direction, but soon gather in a covey. There is little danger that they will wander off the preserve, since under normal conditions a covey of quail will live out its life within a quarter of a mile radius.

Quail for the market are custom dressed, packaged four to a package, and frozen. At 16 or 17 weeks of age, these pen-raised quail will weigh 8 ounces live weight, 6 ounces dressed. This is about one fourth more than quail taken from the wild will weigh.

The live birds are shipped express from Joplin and will arrive at any point in the United States in four days or less. Feed and water are supplied en route, and since quail are good travelers, losses are negligible. Last year Lowrance lost less than half a dozen in shipping.

About the first of March selected birds are taken to the breeding pens. These pens are 4 by 6 feet with three compartments for three pairs of birds. Under the hinged roof is a small box for the nest, filled with straw, and water and feed containers. The birds are fed a special high protein (28 per cent) commercial laying mash and grain. Only the largest birds, selected for high egg production, are used as breeders.

Producing the Eggs

Taking a leaf from the poultrymen, Lowrance has introduced artificial daylight as a stimulus for egg production, but for a slightly different reason. The quail's egg laying cycle is regulated by the length of daylight. In the wild, about the first of May when the days lengthen, the hen starts her first laying. By erecting lights above the breeding pens, Lowrance stretches out the early March days to May day length, and four weeks later, along about the first of April, the pen-confined hens start to lay.

"The colony method, a cock with several hens, has been used successfully with quail, but we prefer to segregate them in pairs. We believe we get better egg production and there are no family troubles," Lowrance explains.

Selection and breeding have changed the egg-laying habits of Lowrance's quail. "In the wild," he says, "the hen lays twelve or fifteen eggs and then starts setting. She shares this job with the cock, who takes his turn on the nest while the hen feeds and stands guard. When the brood is hatched the two stay with the young until they are grown. In the wild, one brood a year is the rule.

"Should a predator destroy the eggs or the brood before the season is over," Lowrance says, "the hen immediately starts laying again. She may do this three or four times, or until the season is over. Otherwise, she lays one clutch of eggs and her

total annual production are the eggs in that one clutch, rarely more than a dozen or fifteen. She is lucky to bring half her hatch to maturity.

"In confinement, with the eggs gathered three times a week, she lays intermittently until the days shorten in August. She lays 25 to 30 eggs, then quits for about 10 days, then starts again." The average production on the Lowrance ranch last year was around 75 eggs per hen. One champ set a record with 144 eggs.

"In the wild," Lowrance says, "laying birds are a year or almost a year old. It was thought for a long time by breeders that quail had to be at least 9 months old to lay. My quail lay much earlier than that. I never keep a bird over—new stock each year. After the laying season is over, the breeding stock are sold for restocking. The only holdovers I have are the laying stock hatched the previous summer. I am holding about 1500 pairs over this year."

Lowrance knows as much as any man about the home life of the quail. "Once they are mated in the spring," he says, "they are devoted to each other, although they do not necessarily take the same mate the following season.

"Quail in captivity make very poor parents and it is a mistake to permit brooding. The eggs will hatch, of course, and the hen and cock will do a fair job of setting. But once the brood is out of the egg the mother and father spend all their time pacing up and down the fence, trying to find a way to lead the brood out of captivity. The young either starve to death or are trampled. The incubator is the best way to hatch quail, and the electric brooder does a better job than the mother quail.

"I've found that the experts are wrong about a number of things," he adds. "Both the cock and the hen use the familiar 'Bob White' call. Often one will give the single note, 'Bob', and the other will finish with 'White'. Another thing you'll hear is that if quail are not scattered by shooting they will inbreed and get smaller. Lack of feed and tough winters cause more deterioration of our wild birds than inbreeding. Since I obtained the eggs for my first breeders from four different localities, there is little chance for inbreeding here.

"Skunks are the worst enemies of wild quail. A skunk loves the eggs, the young quail, and about everything about the bird. There's hardly a meat eating predator that doesn't prefer quail to anything else. Our birds are well protected, but still we've had some losses. We had two visits from coyotes. They got under the pens and grabbed the feet of the birds as they struggled to get away—pulled the feet down through the wire and jerked off the legs. Got fifty in one pen that way. A mink got into a pen one night and cleaned out the pen—bit them through the back of the head and let them lay.

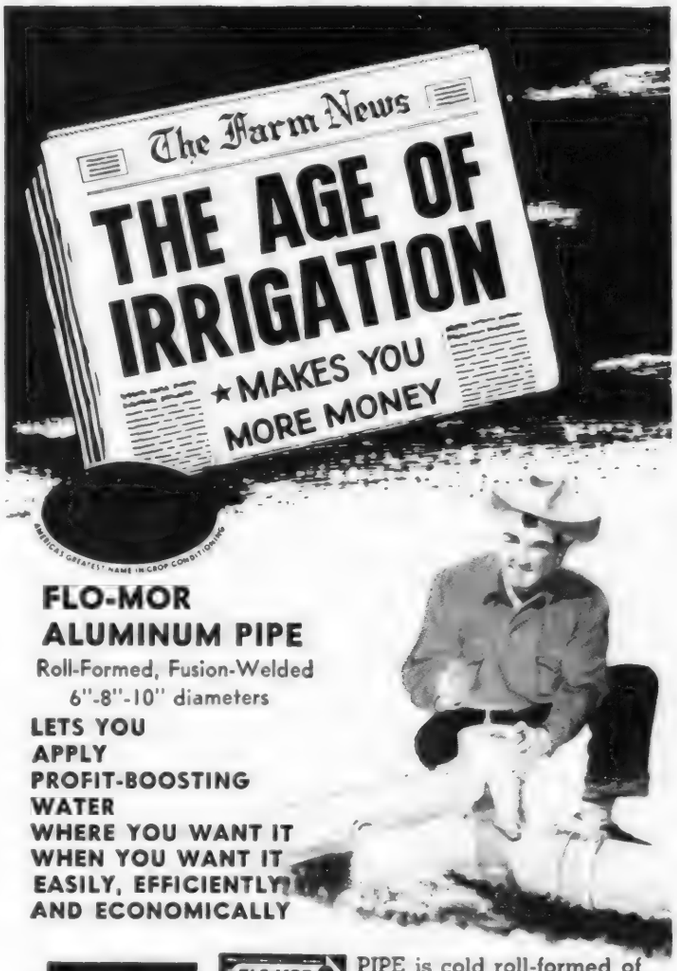
"And speaking of losses, we threw out 1500 dead birds in one day during an extended hot spell last summer. It got to 118 degrees and the birds dehydrated. That's something we can't control."

The Dollars and Cents of Quail

Lowrance has a sliding scale of prices for mature live birds. For delivery between September 1 and December 31, he gets $3 per pair; for January and February delivery, $4 per pair; and for March and April delivery, $5 per pair. The higher price on the late deliveries comes from the cost of carrying them over the winter.

Started chicks, five weeks old, are priced at 20 for $18 and young birds, 8 to 10 weeks old, for restocking, are priced at 20 birds for $22.50. During May, June and July, Lowrance does a thriving business in eggs. On orders for 100 to 500, the price is 30 cents per egg; 500 or more, 25 cents each. The minimum order is 5 pairs of quail or 50 eggs. Breeders are pullorum tested and guaranteed 8 ounces or over. Oven dressed birds, packed in dry ice and shipped prepaid anywhere in the United States, are $28 per dozen. Chukar eggs are $35 per hundred.

The 6 incubators of 3200 egg capacity each used by Lowrance were made by the Leahy Manufacturing Company, Higginsville, Missouri, and cost $200 each. The hatchers were



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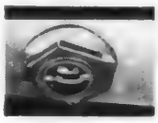

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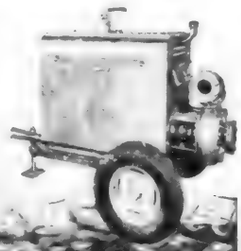
75th ANNIVERSARY DEMING PUMPS 1883 · 1958

PUMPS FOR EVERY FARM NEED
In addition to a wide selection of Deming Irrigation Pumps, the complete Deming line includes a full range of types and capacities of automatic water systems.



Be Years Ahead

WITH

WADE RAIN
Sprinkler Irrigation

IN PROVEN FEATURES
— that Save Time and Labor

WADE RAIN . . . "Leader" in the features that make portable hand-move irrigation fast and easy . . . now brings you practical mechanized moving of laterals . . . WADE RAIN fits any acreage . . . any type of crop.

WADE RAIN Fits Your Farm
With All that's new in Sprinkler Irrigation!

New Revolutionary **POWER-SHIFT**
Light tractor quickly moves the complete line as a unit without going through crops!

POWER-ROLL
Wheel-mounted sprinkler line rolls laterally across the field — with its own power unit. One Man Operation.

Famous **WADE RAIN** Hand Move Features include Self-Locking Coupler, Self-Draining Gasket

IN CROP PRODUCTION
— Quality and Quantity

With WADE RAIN you grow bigger crops of higher quality . . . reduce the cost of irrigation and increase profits! Row crops, field crops, orchards, pastures . . . spectacular gains are common with WADE RAIN!

FREE
"FARM-FACTS" Planning Form
makes it easy to plan the Sprinkler Irrigation system that will assure you the utmost benefits!

*Ask About 5 YEAR Purchase PAY PLAN

R·M·WADE & CO.
SINCE 1865
1919 N.W. Thurman St., Portland 9, Ore.
Please send me FREE "Farm-Facts" Form and Illustrated WADE RAIN Literature.

Name .....
Rt. & Box .....
City ..... State. ..... W-N

made by the same company. The Lyon Rural Electric Company, P.O. Box 30, San Diego 12, California, makes the brooding equipment. To control diarrhea, Lowrance uses one tablespoonful of Sulmet per gallon of drinking water for two days. If the attack is not arrested, he skips four days and uses again for two days. The major feed companies have starting, growing and maintenance feeds designed for game birds. Lowrance uses about 75 tons of commercial feed a year and buys it for about $125 a ton.

For the beginner, Lowrance has this advice: (1) Start small. (2) Forget all you know about chickens. (3) Keep quail away from poultry. (4) Do not feed mouldy or damp feed. (5) Give the birds fresh water and feed daily. (6) Keep everything everlastingly clean.

Here is Lowrance's favorite recipe—Southern Fried Quail:

Thaw frozen quail by soaking in warm medium salt water for 2 or 3 hours, wash clean, leave whole. Put flour, seasoned with salt and pepper, in a paper bag. Then put a quail in the bag and shake until well covered. Brown slowly on both sides, in ½ cup hot fat, turning only once. If not enough quail to fill skillet, slice enough Irish potatoes to fill remainder of skillet; cover tightly and cook slowly or bake in moderate oven (325 degrees) until tender, about 45 minutes. Serve with gravy made from the drippings.

The Industry, the Markets, and the Law

Lowrance markets his dressed birds by advertising and personal solicitation. He advertises in such magazines as Esquire, Gourmet, and The New Yorker, reaching a high class trade which doesn't care how much a delicacy costs as long as it is quail. Birds for restocking, field trials and breeding are advertised in sportsmen's magazines and through direct correspondence with shooting clubs and sportsmen.

The decrease in wild game birds has stimulated the growth of private shooting preserves all over the country. The typical preserve is an area of waste land with good cover on which the owner releases enough

BOB-WHITE QUAIL

Sept. 1st to Dec. 31st Delivery..$3.00 per pair
Jan. & Feb. Delivery..... 4.00 per pair
March & April Delivery..... 5.00 per pair
Mature Birds

STARTED CHICKS—July to October
(5 weeks old).....20 chicks for $18.00
Young Birds (8 to 10 weeks old, 2/3 grown), ideal for restocking, for sale July to Nov... 20 birds for $22.50

Eggs for sale in May, June and July
100 to 500 eggs.....30c each
500 or more eggs.....25c each

Minimum order: 5 pairs quail or 50 eggs
All prices F.O.B. Joplin, Mo.
[illegible] Our Breeders are Pullorum tested [illegible] over-wintered, and range reared [illegible] paid anywhere in U. S. A. [illegible]
Sept. 1st to Jan. 31st

LOWRANCE QUAIL FARM
1730 Picher Joplin 2, Mo.

birds so that his customers can expect a reasonable return for the hunting fee. Some owners, such as E. H. Bates, of Darlington, Maryland, raise their own birds. Bates raises 12,000 birds a year and markets them all through his hunting preserve.

By far the most popular of the game birds, in point of the number of breeders engaged, are pheasants. They are relatively easy to raise, afford good hunting sport, and make a sizable contribution of meat on the table. However, there is now a boom on in chukars, a plump, chunky native of the Himalayas, almost as big as a pheasant and as tasty as a quail. Carl Lowrance raised a few hundred last year and likes everything about them. He says, "The chukar is the coming game bird. They are more hardy than quail, much better than pheasant as a table delicacy, and tops in front of the hunter."

Anyone who raises game birds sooner or later gets an education in the amazing and fearful variations of our game laws. Before shipping a bird, alive or dead, out of your own state, it would be wise to find out how many laws you are breaking. Actually, we have 48 different sets of laws governing the shipping, shooting, sale, and eating of any game animal or bird. For example, in Missouri you may sell dressed birds to the consumer, but they can not be resold. This shuts off markets such as delicatessens and groceries. In Ohio, you can't shoot a quail at any time, even if you raised it in your back yard, for in Ohio the quail is a song bird. In general, the Southern and Tidewater states have the most lenient and realistic laws on game birds, for in these localities they have been long regarded as a source of meat.

The variations, contradictions, and ramifications of the various state laws are too complex for this article. The breeder is advised to write to the several state game commissioners when and if he wishes to do business on a national scale.

Geographical List of Breeders

Following is a partial list of the big breeders: initials after the name indicates (Q) quail, (P) pheasant, (C) chukars:

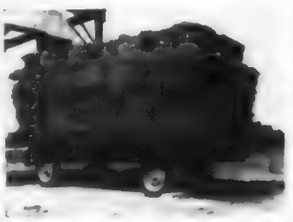
Alabama: Saunders Game Farm, (P), 107 Pine St., Garywood, Bessemer, Ala. Robert Bruce, (P), Route 3, Box 1348, Birmingham 8, Ala. Ed Gartman, (P), Fernbank, Ala. **Arkansas:** H. T. Bagbey, (Q), Route 8, Little Rock, Ark. Magnolia Game Farm, (P), (Q), (C), Magnolia, Ark. Hollis Johnson, (Q), Route 9, Little Rock, Ark. **California:** Rockwood Pheasant Farm, (P), Apple Valley, Calif. **Connecticut:** Broll's Game Farm, (P), Rockville, Conn. **Florida:** J. B. Harding, (P), Arcadia, Fla. Mrs. Ladas Murphy, (P), P. O. Box 1652, Pensacola, Fla. Gene Stewart, (P) (Q), Wauchula, Fla.

Georgia: Alton Jones, (Q), 11 Cochrane Dr., Newnan, Ga. J. B. Clyburn, (Q), 223 Altoona Place, S.W., Atlanta, Ga. W. E. McDuffie, Jr., (P), 2085 McKinley Rd., S.W., Atlanta, Ga. Mrs. E. L. Watkins, (P) (Q), 1766 Rogers Ave., S.W., Atlanta, Ga. V. L. Beasley, (Q), Forrest Park, Ga. **Illinois:** Oak Mound Game Farm, (P), Carl Behnke, Mgr., McHenry, Ill. Clyde Parfry, (P), Spring Grove, Ill. Carrol A. Berry, (P) (Q), 1005 N. Park St., Taylorville, Ill.

Idaho: John Bartee, (P), Star Route, Bliss, Idaho. **Indiana:** Herbert B. Huehner, (P), S. Bend Rd., R. No. 4, South Bend, Ind. **Kansas:** Dale Bacon, (P), Gardner, Kans. Walter J. Loving, (P), 4124 Georgia, Kansas City, Kans. Robert Meese, (P) (Q), Mound City, Kans. **Louisiana:** Earl Bufkin, (Q), Norwood, La. Russell C. Heldenbrand, (P), 306 Country Club Dr., New Iberia, La. Leslie Morris, (P) (Q), Box 187, New Iberia, La. W. C. Segura, (P) (Q) (C), 729 E. Main, New Iberia, La.

Maryland: Charles Marburg, (P) (Q), Lutherville, Md. **Michigan:** Bob Ferris, (P), 407 Days, Buchanan, Mich. Charles A. Kelly, (P), 401 Berrien, Buchanan, Mich. **Minnesota:** Glendolough Game Farm, (P) (C), Battle Lake, Minn. Elwell Pheasant and Chukars Farm, (P) (C), Forest Lake, Minn. Anderson Game Farm,

MAKE MONEY
DRYING
GRAIN OR HAY



Drying equipment engineered for convenience and safety . . . designed for getting all drying jobs done quickly, satisfactorily, and economically.
We have standard units or can engineer and build units to fit your problems.
Consists of: Building, Dryer, Wagon Beds, and all Duct Work. Adapted for drying all types of hay, grain, seed, corn (ear and shelled) and other crops. Will dry 8 tons of hay overnight and 200 bu. of corn or grain on each wagon.
Hay should be loaded in a uniform manner, with cut edge down on the wagon flooring.
Standard wagon bed, 8'x16' with standard holders for side rails. Shipped knocked down and ready for assembly on your own wagon frame.
We invite your inquiries for literature or recommendations, or for the name of our dealer nearest you.

Drying units available for use with liquefied petroleum gas, with a range of 100,000 to 3,000,000 B.T.U.'s. The newest equipment on the market. WRITE FOR DETAILS.

PEIRSON-MOORE CO.
LEXINGTON, KENTUCKY
"Pioneers In Crop-Drying Equipment"

SOLD
to more FARMERS
than ANY OTHER
INDEPENDENT CHOPPER!
• GEHL •
THE PACE SETTER...
Farmers proved it in '54
FLASH!
GEHL now offers a NEW, big capacity 6-foot MOWER BAR attachment.
GEHL "Chop-All" Harvester, 4 Attachments with "Quick-Switch" — Windrow Pick-up, Mower Bar, 1 and 2 Row.
WHY I LIKE GEHL
"We've been waiting 20 years for a chopper like the Gehl 2-Row. I cut 500 tons of ensilage in 59 hours from 160 acres of corn—10 ft. tall down to 1 ft."
—Harold W. Ellis, Coldwater, Kan.
"We cut two rows just as fast with our GEHL "Chop-All" PTO as we did with our 1-Row motor-mounted chopper. We recommend it to anyone with any amount of chopping to do."
—J. P. Grahl, R. 1, Eden, Wis.

GEHL Chop-All HARVESTER

GEHL BROS. MFG. CO.
Dept. MF-594, West Bend, Wisconsin

Tell me how to save money with the Low-Cost GEHL PTO 2-Row "Chop-All" ☐
I want to save money making my own forage wagons and all-purpose Bunk Feeder with GEHL Parts. ☐
Send me your Grassland Farming Books. ☐

Name.....Acres Farmed.....
Address.....State.....

"Sure there's a lot of Rotary Cutters on the market..

"Most of them are good ones, too. That's what helps make the American farmer the most efficient in the world. Free enterprise—and manufacturers going all out to make the best farm equipment they can.

"When I decided upon a rotary cutter, I looked lots of them over carefully—tried some of them out. I bought a Roto-Speed. They all had their points, but in my opinion Roto-Speed was the all-around best. I've never regretted my choice. My Roto-Speed mows my pasture, cuts stalks, clears the undergrowth from my land—fast. It's filled every one of the dealer's claims, and then some. Already it's paid for itself.

"But don't take my word for it. Look them all over yourself. I believe you'll agree with me on the Roto-Speed. If you do, you can depend upon it to do all of your cutting jobs fast, clean and easy. Take it from me—I know."

The Lilliston Implement Company manufactures several Roto-Speed models including: the 7½ foot cut 7-Six, the hydraulic lift type 5-Two, and the heavy duty 5-Two Tow—a size for every farm and tractor. For full information and the name of the dealer nearest you, write:

LILLISTON IMPLEMENT COMPANY
ALBANY, GEORGIA
For Over Forty Years Producers of the Finest in Specialized Farm Equipment

When minutes are precious, it's worth its weight in gold!

SERVICE STATION ON WHEELS

When minutes are precious and field work must be done quickly, you'll find this service station on wheels a God-send. Equipped with Tokheim hand pumps (1), and auxiliary tanks for gasoline and oil; grain bags, water jugs and similar essentials, this pick-up truck can speed to distant acres quickly to keep men and machines producing.

Important also are the Tokheim electric gasoline pump (2), and the new sprayer-compressor (3). Placed in and adjacent to a service shed they provide a *quick* and *safe* source of fuel and air for inflating tires, lubricating, cleaning, spraying, painting. Thousands in use giving satisfactory service. See your oil company, your Tokheim representative, or write factory.

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TOKHEIM CORPORATION
Designers and Builders of Superior Equipment
1626 Wabash Ave. *Since 1901* Fort Wayne 1, Ind.
Factory Branch: 1309 Howard St., San Francisco 3, Calif.
Write for FREE BOOKLET
"How To Install Underground Tanks"

(P), Northbranch, Minn. **Mississippi:** F. M. Hunter, (P), State College, Miss. Henderson Josey, (P), Starkville, Miss. W. E. McGee, (P), Columbus, Miss. J. S. Sherrel, (Q), State College, Miss. Rush Valentine, (P), State College, Miss.

Missouri: Arthur Brooks, (P), 620 S. 9th St. Joseph, Mo. James Stewart, (P), Lee's Summit, Mo. Bert Mahaffey, (P), Bolivar, Mo. Burnett Quail Farm, (Q), Tecumseh, Mo. Dr. P. M. Pence, (P) (Q), Ozark Quail Farm, Centerville, Mo. Carl Lowrance, (Q), 112½ East 13th, Joplin, Mo. Lonnie Scott, (Q), Brownington, Mo. Bob Peckenpaugh, (P) (Q), Clinton, Mo. Gilbert Bradley, (P) (Q), Creighton, Mo.

New Jersey: Jos. Pettit, Jr., (Q), R. D., Woodstown, N. J. **New York:** Geo. Schellinger, Jr., (P), Clay Pitts Rd., Sag Harbor, L.I., N.Y. Mike Pender, (P), Goldensbridge, N. Y. Neil Clark, (P), Greenhaven, N. Y. John Mackay, (P), Poughquag, N. Y. **North Carolina:** Smoky Mt. Game Farm, (P), Canton, N. C. **Ohio:** Pheasant Farm, R. B. Ridenour, (P), 90 N. Diamond St., Mansfield, O. Robert B. Ridenour, (P), U. S. Rt. 42S, Mansfield, O. Talmadge Game Farm, (P), Jeromesville, O.

Oklahoma: Oakwood Game Farm, (P) (Q) (C), Ada, Okla. Jack Trimble Game Farm, (P) (Q), Rt. 1, Afton, Okla. Lonnie Sigman, (P) (Q) (C), South of City, Ardmore, Okla. Tucks Pheasant Farm, (P) (Q), North of City, Duncan, Okla. Vernon Bagwell, (P), (Q), 1300 S. Memorial, Tulsa, Okla. Sherman Glass, (P), 3601 N.W. 10th St., Oklahoma City, Okla. Thompson Game Farm, (P), Castle, Okla. Lon Jackson, (P) (Q), Sapulpa, Okla. Tony Hooker, (P) (Q), 67 Worth Utica, Tulsa, Okla. **Pennsylvania:** Harris and Stipe, (P), R.D. 4, Gettysburg, Pa. Orvis Gulp, (P) (Q) (C), R., Wallingford, Pa.

Texas: L. O. Holloway, (P), Rt. 2, Box 297B, Mineral Wells, Texas. Wilson Murcia, (P) (Q), 418 E. Morris St., Yoakum, Texas. Harry Wahl, (P), 410 Rose St., Yoakum, Texas. G. W. Whitney, (P) (Q), Box 712, Austin, Texas. Mrs. Leroy Calvin, (Q), Rt. 4, Caldwell, Texas. Malcolm Stone, (Q) (C), Gladewater, Texas. Thurman Pepper, (Q), Laneville, Texas. Adon Duncan, (Q), Rusk, Texas. Ide Hall, (P) (Q) (C), Rusk, Texas. John Lester, (P), Rusk, Texas. R. E. Ruse, (P), Rusk, Texas. C. E. Duffield (Q), Rose Haven Farm, Tyler, Texas. Claude Holley, (Q) (C), Tyler, Texas. Mayne Bird Farm, (P) (C), Chandler HiWay, Tyler, Texas. Eskew Bros., (P) (Q), 1503 Chelsea Lane, Austin, Texas. Gunn Bros., (Q), Amarillo, Texas. G. E. Whitney, (P) (Q), 503 West 30th Austin, Texas.

Virginia: Crosswhite Quail Farm, (Q) (C), Abingdon Va. Marvin E. Lester, (P), Pulaski, Va. Craig Kennels, (Q), Trevilians, Va. King Kennels, (P) (Q) (C), Culpeper, Va. Charles Rogers, (P) (Q), Dublin Rd., Pulaski, Va. E. G. King, Boarding and Training Kennels, Rixeyville, Va. **W. Virginia:** G. W. Conley, (P), Oceana, W. Va. **Wisconsin:** Roman Skroch, (P), Independence, Wis. MacFarlane Pheasant Farm, (P), 1404 Center St., Janesville, Wis. Blonhaven Game Farm, (P), Milton Jct., Wis. Van Zeeland Bros. Fox River Game Farm, (P), Kaukauna, Wis. Lester Gesteland, (P), Janesville, Wis. **Wyoming:** Royal Game Bird Farm, (P), Cheyenne, Wyo.

FARM WANT ADS

This new FARM QUARTERLY department is open for advertisements of quality products and services. Rates 75c a word including each word in name and address. Terms: Cash with order. Circulation: 211,000. Advertisements for the Autumn issue accepted until July 10, 1955.

GAME BIRDS

GUINEAS—Pearl (dark)—white—white meat. Selected breeding stock. Blood tested. Day old and startd five weeks. Guinea Roost Farm, Route 3, Jefferson City, Missouri.

RINGNECK PHEASANTS. Chicks until July 27. $40 per 105 Pullorum clean. Literature. Mature pheasants. Large scale pheasant production since 1929. MacFarlane Pheasant Farm, Janesville 17, Wisconsin.

FORTY VARIETIES PHEASANTS, quail, partridge, wild turkey, peafowl, wild ducks and geese. Eggs, chicks and stock for sale in season. Robert W. Weese, Mound City, Kansas.

QUAIL, RINGNECK PHEASANTS and Chukar Partridges. Eggs, chicks, started birds. Five weeks, eight weeks, two-thirds grown. Restock now. ESKEW BROTHERS GAME FARMS, 1503 Chelsea Lane, Austin, Texas.

QUAIL, PHEASANT, CHUKARS. Buy with confidence from the largest commercial Quail Farm in Texas. Whitney Quail Farms, Rt. 3, Box 212, Austin, Texas.

BOBWHITE, VALLEY, GAMBLE, RED, BLUE JAPANESE QUAIL—Chukar, French Red-leg, Hungarian, Ruppels' Francalin, Crested Tinamou partridge. Birds for restocking, breeders, and frozen Quail. Malcolm S. Stone, Box 11, Gladewater, Texas.

BOOKS

AMERICAN PIGEON JOURNAL, Warrenton 4, Missouri, leading pigeon magazine. Tells how to raise pigeons successfully. Illustrated 36-page monthly. $2 year.

AMERICAN RABBIT JOURNAL, Warrenton 4, Missouri, tells how to make money raising rabbits. Meat and fur. 36-page monthly. Illustrated. $1 year.

BREEDERS CATALOG. Send fifty cents for big livestock supply catalog Number 55. Eighty pages, over five hundred illustrations. Money refunded with first five dollar order. Breeders Supply & Equipment Co., Box 1360, Lexington, Kentucky.

FREE BOOKLET ON FLORIDA farming. Send for 36-page booklet with information on every phase of Florida farming. Learn about Florida's extra advantages—long growing seasons, multiple crop production, diversification, expanding markets. Florida needs experienced farmers with adequate capital—truck farmers, dairymen, poultrymen, livestock raisers, nurserymen. And Florida offers happier year 'round living for you and your family. Plan a Florida sightseeing vacation soon. Visit famous attractions, and the farm areas. Send today for Florida farm booklet and we'll include vacation folder with color pictures of 25 Florida scenes, both free! Write State of Florida, 6427-D Commission Bldg., Tallahassee, Florida.

FARM WANT ADS

(Continued)

CALVES AND FEEDERS

MOBRIDGE LIVESTOCK Commission Company, Inc. Fresh producer-consigned livestock handled at our regular livestock sales every Thursday. Special calf and feeder sales in the Fall. Mobridge, South Dakota. P. O. Box 357. Nestor. S. Mehrer, Manager.

CATTLE

For high grade and registered Holsteins and Guernseys of better quality selected for production type and health contact: Ernest LeJeune & Associates, Riverside Stock Farm Barron, Wisconsin.

DOGS

BRADFORDS' BORDER COLLIES are professional livestock and poultry herding dogs. Puppies the latest in the best of bloodlines. Also trained dogs. Route 5 Box 7, Wooster, Ohio.

FARM REAL ESTATE

FAMOUS SHENANDOAH VALLEY of Virginia stock farms. Rich limestone soil, plenty water and grass. Mild climate, good markets. Excellent schools and roads. Low taxes. 50 to 1000 acres at investment prices. Write requirements. Earl Bland, 51 Forest Hill, Roanoke, Virginia.

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YOUR FILMS fine grain developed: Contact size 4c each. Jumbo size 5c each. Super jumbo size 6c each. Write for free mailer and details. Mac Photos, Box 460B, Hackensack, New Jersey.

FRUIT

ORANGES, DELICIOUS GOLDEN VALENCIAS. Organically grown, no poison sprays, chemicals. Shipped tree-ripened from grove. Request descriptive price bulletin. Koentopp Ranch, 1010 N. Broadway, Santa Ana, California.

INSPECT SPRAY

AMAZING NEW INVENTION KILLS ALL TYPES OF INSECTS. Silent, odorless, colorless, mysterious. Mothproof YOUR wardrobe with two hour treatment. More powerful than D.D.T. Approved safe. Ten year guarantee. FREE DETAILS. Andrews Company—Dept. F-2, 2537 Nancelon, Macon, Georgia.

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BLUEGILL fingerlings for private pond stocking. The finest northern stock, also Bass and Bait Minnows. Write for prices and information. Millstream Fish Hatchery, R.R. No. 1, Pierceton, Indiana.

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COLUMBIA SHEEP, registered ewes and rams. Top Bloodlines with production records. Developed by U.S.D.A. for high production of lamb and wool. Fairview Farm, Harold Tangeman, New Bremen, Ohio.

FOR SALE—10 top Corriedale stud rams—30 yearling ewes. More wool. More lamb—Get more Corriedale Sheep. H. H. Walker & Sons, Gambier, Ohio.

OAKLAND FARM Registered Southdown Sheep. Excellent size, quality, type. Price right. Bred right. Seventy ewes, Fifty rams. Aberdeen-Angus Cattle, Earl Marshall strain. John D. Wright, Millersburg, Ky.

FOR SALE—Registered Hampshire sheep. Will sell flock or in groups, reasonable. Inquiries promptly answered. Inspection invited. Well-known bloodlines predominate. Frank Reed, Pine Road, Philadelphia 11, Pa.

REGISTERED HAMPSHIRE SHEEP bred for production and rapid growth. The home of three great imported stud rams, Shapwick Progress, Chilmark Herald and Stype Valour. We welcome inquiries and inspection of our flock. Sheepfields Farm, New Vernon, New Jersey.

FOR SALE: Registered Hampshire Sheep—Rams and Ewes. Breeding stock for sale most of time. Robert Middleton, Jr. & Son, R.R. No. 2, Jacksonville, Illinois.

DAKES SOUTHDOWNS—Both stud and commercial rams available now, also a few ewes. We ship on approval anywhere. Charles V. Dake, Greenfield Center, N. Y.

We offer fine ROMNEYS AND SOUTHDOWNS. Also excellent commercial stock. Sandanona Sheep Farm, Brattleboro, Vermont. Mrs. Henry G. Persons, Tel. Alpine 4, 4882.

COLVILLE HAMPSHIRE SHEEP. Our flock has 20 years of constructive breeding and gives you more than eye can see when you buy our quality Hampshires. Walter Colville, New Sharon, Iowa.

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REGISTERED LANDRACE HOGS. Only finest blood lines maintained greatest improvement in swine—one boar will make your present sows produce meat-type hogs—one pound gain for three pounds feed. Middle Fork Farms, Greensburg, Indiana.

STAR FARM BERKSHIRE HOGS—Winter boars and gilts $75.00 each. Registered, immuned, thrifty, shipped anywhere. Unrelated trios available. Write D. H. Zook, West Liberty, Ohio.

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SAVE. BUY SURPLUS direct from government. Farm tools, machinery, feed, truck, tractor, jeep, power units, hundreds others, government surplus bulletin $1.00. Box 169 G, East Hartford 8, Conn.

WOOLEN PRODUCTS

FARMER'S WOOL made into blankets, batting, robes, and yarn. Circular free. Specialists in custom work since 1866. Monticello Woolen Mills, Monticello 14, Wisc.

OLIVER SUPER 55 TRACTOR uses VICKERS® HYDRAULICS to provide SUPER VERSATILITY

AUTOMATIC CONSTANT DRAFT CONTROL

AUTOMATIC IMPLEMENT POSITION CONTROL

When irregular ground or soil conditions tend to increase or decrease draft, the Vickers Servo Valve acts automatically to raise or lower the implement slightly. Movement is so smooth as to be almost imperceptible . . . with no sign of jump. Overloading, wheel slippage and stalling of tractor are prevented. Flipping a lever on the valve automatically provides constant depth regardless of ground contour or changing soil.

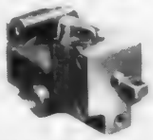
INDEPENDENT HYDRAULIC CYLINDER CONTROL

Addition of Vickers 3-in-1 Valve permits operation of pull-type and mounted equipment of all kinds independent of main hydraulic system but using same pump.

VICKERS® SERVO VALVE

Provides smooth, accurate and instant response to load or position changes of hitch tools. It is mounted inside the oil reservoir and has an external lever.

VICKERS® 3-IN-1 VALVE



Four-way directional valve with built-in flow control and relief valve is mounted externally to provide control for separate hydraulic system (front- or side-mounted equipment).

VICKERS® PUMP

Hydraulically balanced and having automatic wear compensation, this pump delivers more oil while taking less power. A single pump supplies all needs.

The new Oliver Super 55 Tractor demonstrates to excellent advantage the many benefits that Vickers Hydraulics offer the farmer. On the Super 55, a Vickers valve and pump are used to provide the 3-point hitch tools with either automatic constant draft or automatic constant depth . . . at the flip of a lever. By addition of the Vickers 3-in-1 Valve shown at the left, a separate and independent control system can be provided for operating front- or side-mounted equipment. Built-in overload relief protects against damage, while merely turning a knob on this valve changes the amount of oil flow for fast or slow operation.

This is another example of the many ways in which Vickers Hydraulic equipment is working on the farm . . . helping make a wide variety of jobs easier, quicker, more economical. The next time you buy farm machinery, it will pay you to make sure the hydraulic units are Vickers.

People who look for quality in tractors and farm equipment also look for VICKERS.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

STOP NEEDLESS REPAIR with TIMELY CARE!

HOBBS Engine Hour METER

tells you when

For fewer repair bills and longer tractor life, you need a HOBBS HOUR METER. Regular care is the way to full return on your investment.

New and improved through continuing engineering research

RECORDS ENGINE TIME ACCURATELY

An electric timing instrument that shows HOURS and MINUTES of tractor operation — NOT A REVOLUTION COUNTER. Tells WHEN to change oil and filters, lubricate, overhaul, etc. Approved and recommended by leading tractor manufacturers. Ruggedly built . . . easy to install . . . LOW PRICE.

• See your dealer or WRITE FOR LITERATURE

John W. Hobbs Corporation
2066 YALE BLVD. SPRINGFIELD, ILLINOIS
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MIRACLE IN THE SOUTHWEST

Continued from page 36)

for spraying is from sun-up until breakfast-time): he knows that he will live in a world surrounded by bad smells during the spraying season. He is well aware of the need for a high degree of skill as he skims the top of the trees in a permanent power-stall to give the right kind of a "boil" to the spray to force the chemicals down into the foliage. But he takes the same professional pride in his work as a plowing champion does on the home place field alongside the state highway.

If you stop in Clarksville to see Claud Hall, he may take you on a short-cut across the Arkansas River in a fishing boat to see 600 acres of river bottom land which he sprayed for T. L. and Lewis Geren in the Spring of 1954. Just a year ago it was growing some of the biggest cottonwoods, sycamores, and oaks in the Ozarks. It is easy to see where the spraying stopped, for the tangled jungle of trees is still in control beyond the Geren's property line. Lewis Geren is no windshield farmer; he has a bulldozer and he started pushing over the dead trees early in February of this year. The complete spray job had cost him $8 an acre and the bulldozing cost another $8 an acre. The trees were pushed into windrows and burned in early March. A plow went through the field easily. Even the stumps were rotten, and broke up with the kick of a boot. By May—and another $8 in plowing, disking and seeding later—the oats were waving a bright green and acting as a nurse crop for the clover underneath. Land that had cost $2 an acre was now worth $200.

Basal Bark Tree Killing

The methods of using the sprays have become part of the farmer's working talk in the Ozarks, and the results have been so spectacular that land prices have jumped the traces. But can the same methods be used in Michigan, in Virginia, or Iowa? Range specialists say they can, and they will go further and tell you that you don't have to use an airplane, which is best adapted to large tracts. For $17 to $40 you're in business. All that's needed is a garden or knapsack type sprayer and a gallon of 2,4,5-T. Get the type of 2,4,5-T that has 4 pounds of acid to the gallon. Then you mix the gallon of 2,4,5-T with 20 gallons of Diesel oil, and put it to work on the brush that is edging into the back forty. In a year an acre or two can be added to the field with a few hours' work, using the basal bark method of spraying the trunk.

The basal bark treatment can be used at any time of the year. Wet the tree from a height of 18 inches above the ground, all around the tree, down to the ground. And spray some on any exposed roots, too. Have the sprayer adjusted so that it puts out a stream, not a mist. The chemicals and oil for basal bark tree-killing will cost from $4 to $20 an acre, depending

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on the number of trees and how much spray chemical you apply.

A knapsack sprayer can be used to spray the foliage of a tree but this begins to get into the category of hard and slow work. A power-driven sprayer that will develop about 200 to 300 pounds pressure and has an orchard type nozzle and 20 or 30 feet of hose is the tool that many farmers have used to work on larger areas of trees and brush. For example, The Thompson Chemicals Corp., maker of 2,4-D and 2,4,5,-T, has developed its own type of boomless sprayer which is mounted on the back of a tractor and has been used in their test spraying plots near Branson, Missouri. A number of farmers have used the inexpensive tractor-mounted pumps and spray equipment (cost $69.50) made by Continental Belton of Belton, Texas, and combined it with a 55 gallon drum. This outfit has a gear pump drive from the tractor power take-off.

The chemical companies advise against using equipment that is to be used for spraying fruit trees or field crops. In spraying foliage the best results are obtained by doing the work in May, June, or July while the leaves are green and the plant is active. For foliage spraying, take ½ gallon of 2,4-D and ½ gallon of 2,4,5-T and mix them with 4 gallons of Diesel oil to make 5 gallons of basic chemical mixture. Use the type of chemical that specifies on the can, "four pounds of acid per gallon." This mixture is added to 95 gallons of water to make 100 gallons of foliage spray. For a smaller amount of spray, use one-half of the basic 5 gallon chemical mixture and mix it with water in a 55 gallon drum that is nearly full. The treatment consists of spraying the foliage, both tops and undersides of the leaves, until it is all well covered. It is best to spray early in the morning or late in the afternoon when there is little wind. These spray chemicals are extremely volatile and *can* drift for miles. It is embarrassing and can be downright expensive to have the 100-year old elm in your neighbor's front yard turn an ugly brown in a couple of weeks; and that is what will happen to the trees that you spray. And take care not to spray near any corn, raspberry patches, or any other growing crops. The cost of chemicals for high-pressure foliage application from the ground is about the same as for basal bark application—$4 to $20 per acre.

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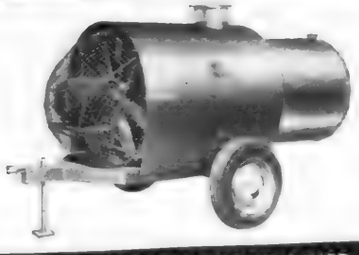

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Airplane Application

The most important part of airplane application of brush-killing spray is to do the flagging right, so the pilot can make accurate swaths over the area. The ground crew—brush apes, as they are known in the business—and the pilots must know the area and plan their spray runs carefully. Spraying up and down the narrow valleys can be tricky work and the flagmen must have their work planned. Usually the farmer is asked to supply a couple of men to work along with the two experienced flagmen who are part of the crew. The spray mixture used for most aerial work is made up on the job. Diesel oil and the acid (usually a 50-50 mixture of 2,4-D and 2,4,5-T) are transported to the job in a big semitrailer and then ferried out to the landing strips, if the country is extremely rough, in a Jeep. An operator wants an 1800 foot landing strip clear of obstacles at one end from which to operate his planes. He doesn't want his strip to be more than three miles from the brush he is spraying, for his unproductive flying time will cut down the time he can spend in the actual spraying operation.

The area to be sprayed is first laid out to allow flight runs as long as possible. The area is then marked with permanent flags. These flags, about 24 inches square, are attached to bamboo poles, securely fastened to tree tops by a couple of the brush apes who are good climbers. The permanent flags are placed in a pattern spaced approximately every ¼ mile along the flight path and at the boundaries. A swath width is 26.4 feet, and 10 flight swaths are flown between each permanent flag. Men on the ground with flags (36 inches square) on bamboo poles step off 26.4 feet for each swath after each pass of the plane. It is not always possible in heavy growth for the pilot to follow the men on the ground. He can, however, quite accurately follow his swath course by calculating from the permanent flags.

The swath width of 26.4 feet allows a good overlap from each swath, since the spray from the plane spreads out for 50 to 60 feet. All of the trees get hit by spray three or four times, but this is all to the good and makes for a high kill.

The ground crew, by keeping careful records of the swaths between each permanent flag, can check delivery. Flight errors are kept at a minimum in this way. The spray delivery is also checked and adjustment in the equipment or nozzles can be made if necessary to assure a proper put-out of chemicals.

Ten swaths, one mile long, cover 32 acres and should consume 160 gallons of spray mixture with a limit of error of 2 to 3 per cent plus or minus.

If air spraying is done carefully, it can be as efficient as any other method of application. The woody plant count in some brushy areas of Arkansas averages 240 low-grade hardwoods of 6 inch diameter and over 8000 under 6 inch, per acre.

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A kill of from 75 to 95 per cent has been made. The materials, chemicals, and oil for aerial spraying cost about $4 an acre and the operator will charge $3 to $5 for applying them. This is the cheapest and fastest way to kill brush, but it is best adapted to large acreage.

Complete eradication of all brush is seldom accomplished by a single airplane spraying. When complete eradication is wanted, it may be necessary to make a repeat spraying in a year or two to kill undergrowth that was not killed with the first application. By then there will be the seedlings that come up from acorns, seeds and nuts left in the ground.

After aerial or foliage spraying or basal application in the summer, the sprayed trees will turn brown from two to four weeks following application. However, there may be a lot of green leaves left. Although they are still green, they are absorbing the chemical and the results will show up the next year. Locust, oak, elm, gum, sycamore, willow, walnut, green briar, blackberry briar and many others will be showing the effects of the chemical first. The ash, winged elm, hickory and hard maple may not be turning brown quite as rapidly but this is due to the fact that, although they have taken in the chemical, they are much slower in showing the effects of it. They may not show any defoliation, but the cambium layer will be darkened. This is the growing layer on the outside of the tree where the cells divide.

The following spring some of the sprayed trees will put out leaves two to four weeks late. These leaves will be very abnormal in size—some very large and some very small. They will be growing out of the large limbs and trunks, not from the small lateral branches as on a normal tree. After a period of four to ten weeks these leaves will begin to turn brown and die. The explanation for this is that the tree has a small amount of energy left and putting out these leaves is its last bid for life. But the root system has lost its ability

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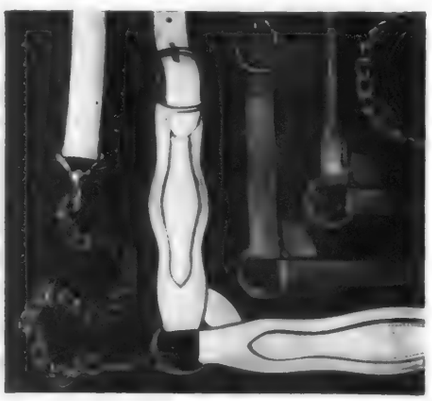

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to gather plant food to sustain the growth, so the leaves turn brown and die.

The chemicals proven best for brush control in the Ozarks are commonly called 2,4-D (dichlorophenoxy acetic acid) and 2,4,5-T (trichlorophenoxy acetic acid). These chemicals are made from benzene, and it was natural for such chemical companies as Pittsburgh Coke and Chemical Co. to get into their manufacture since benzene is an important by-product of turning coal into coke. These hormones (2,4-D or 2,4,5-T) cause the sudden release of the stored energy in the plant and root system. This renders the plant incapable of further carrying on its life processes. The hormones are plant stimulants; they speed up growth of the plants to the point where they die because of an explosive release of energy. The hormone travels by translocation through the plant system quite rapidly.

The actual kill may come within a few minutes, a few hours, a few weeks, or in some cases it may take as much as two years to determine the efficiency of the kill. It is not known definitely how fast this takes place.

The Grass Underneath

Forestry and range specialists point out that spraying should not be done in the true forest areas where there are valuable hardwoods. Where the scrub trees have moved onto good pasture land, the brush killing pays off. Once free of the smothering shade, the native grasses will grow again. When low-grade trees are cleared with ax and saw, there are a dozen or two volunteer shoots ready to spring up where a tree is cut. And, if the top soil is disturbed in the hilly land by machinery, erosion can be a problem. That is the reason the chemical land clearing looks so good in the hilly types of land. Once the grass-cover comes back, the water run-off is lowered as much as 50 per cent.

The pattern of recovery taken by the native grass usually is very rapid. Grass which has grown and seeded itself for generations in a stunted form, suddenly springs to life. The heavy organic litter from the leaves, bark and decaying trees acts like a sponge to hold the moisture and is an ideal nursery for the small grass. When the sun's rays strike the ground, the soil flora and fauna in it spring to life, and the whole area suddenly seems to unfold a green carpet. The fifty inches of rain that the Ozarks get in a normal year keeps it that way.

The native grasses that usually spring up in the Texas, Arkansas, Oklahoma, and Missouri areas are bluegrass, big bluestem, little bluestem, Indiangrass, switchgrass, sideoats grama, eastern gama, purpletop, sand lovegrass and panicum. All of these are considered fine beef-makers, provided the cattle have plenty of this pasture.

Following the brush kill, the management of the grass is most important. The range should be stocked so that not more than 50 per cent of the year's growth of

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grass is eaten. Salt mineral boxes, and watering troughs should be placed to spread out the cattle and get even grazing.

The first questions a farmer asks about chemical spraying is: "Is it dangerous? Will it hurt my cattle? How about the milk?" In the early days of brush spraying the chemical salesman often took a sip of the straight chemical to answer these questions. It doesn't taste good but has no other bad effects than to cause a case of the trots. This was all in the line of duty, though, and gradually the story was put across. The farmers realized that only the broadleaf plants were killed.

One of the long-time battles with the brush in the Southwest has been waged in the brushy areas of Oklahoma. Here developed and improved pastures are now producing 5 to 8 times more hay and beef than they did before clearing. In 1935 work was started with hand tools and since then ingenious machines and chemicals have been built for the work. Brush mowers, saws, beaters, crushers, and root rakes are all part of the arsenal. A root-cutter, consisting of a large V-shaped blade mounted ahead of a track-tractor, has been developed which will shear off trees up to 20 inches in diameter at a rate of 1 to 2 acres an hour, is the big gun in the line-up. After the brush and trees are cleared, they are left where they fall, to rot and add mulch to the thin soil. Burning is not advised, for it was found on test areas that as much as 7,598 pounds per acre of valuable mulch was present from the leaves, twigs, and stems two years after the clearing.

Pete Estes of Wichita Falls has been active in Texas range spraying and works with the new chemicals as they come out in testing them on the rough hombres of the ranches, the mesquite, post oak, black-

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Feeds and Feeding (21st ed.)—by F. B. Morrison $7.00
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jack oak, willow and cactus. This year in March and April they were testing Dupont Karmex W, a new chemical which is what the trade calls a "substituted urea." A fraction of a gram will kill a tree. It is a slow killer and works from the roots where it is dropped in a dry, pellet form. Since this chemical is in a pellet form there is no hazard from drift in an aerial application.

Dow-Kuron is another new chemical that is highly effective against oaks: it has been tested, and will be recommended for use this year in Texas.

Estes says the kill with 2,4,5-T has been good—using 1 pint of the acid to the acre along with one gallon of Diesel oil and 3 gallons of water. The spraying is done from the air 6 to 12 weeks after the leaves appear in the spring. The cost is $2.95 an acre for chemicals and spraying, and one-half of this can be collected from the Agricultural Conservation Program office.

Mesquite control was started commercially in about 1950 as a result of some aerial test plots put out by the Texas Agricultural Experiment Station at Spur, Texas, headed by C. E. Fischer, and in cooperation with the Zigler System of Texas, of Stamford, Texas, the company that furnished the airplanes. As a result of these test plots the PMA Committee of Texas decided to participate in the program and recommended 2,4,5-T in an oil emulsion solution to be sprayed on the mesquites 40 to 90 days after the first leaves appeared in the spring, provided there was sufficient moisture so that the mesquites would make a normal growth. The present recommendation is 1 pint (½ pound acid equivalent) of a low volatile ester formulation of 2,4,5-T in a two-to-one mixture applied at the rate of 4 gallons per acre.

After spraying most of the ranchers prefer to leave the dead brush standing up on their ranchland since they can see their cattle through it and it does not shade the grass. In Texas the good grass will not grow in the shade.

In the early spring, the first year after the aerial spraying of his ranch, Carter McGregor, Jr. of Scotland, Texas, made these observations: "Of course, at this date it is too early to determine with any degree of accuracy the percent of root kill on the mesquite, but right now it looks as though the top kill is going to be at least eighty percent.

"However, one result that is apparent already is the growth of the native pasture grasses. In this area, we have had only a very negligible amount of rainfall in the last six months, but the grasses in the pastures which have been sprayed are still in excellent condition compared to the grasses in the pastures where no spraying was done. There are no weeds in the sprayed area, but the chemical apparently caused an abnormal growth of the grasses, which in our present dry state, is a most desirable situation. The cattle grazing on the sprayed area are in better flesh than

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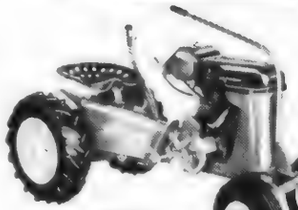

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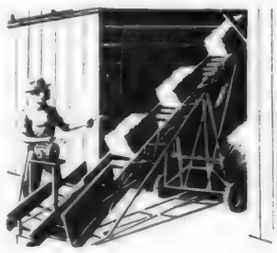

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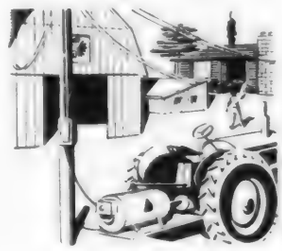

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the others although they are receiving less concentrates and no roughage, while I feed hay in my untreated pastures."

For sand sagebrush and skunkbrush other Texas sprayers are using 2,4-D in a butyl ester form, 1¼ pints of chemical in 3 gallons of Diesel oil sprayed per acre. Some are making an emulsion, using 1¼ pints of the chemical to 1 gallon of Diesel oil, plus 2 gallons of water.

How Cattle Gain

In October, 1952, W. T. Thompson put 79 grade Angus and Hereford heifers on land near Branson, Missouri, which had been sprayed in 1951. A fair native grass stand had developed in 1951 and seeded itself. A heavy stand grew in 1952 with a heavy seed crop. The calves were on the 320 acres until October 1, 1953, and were given no supplemental feed of any kind. It just happened to be one of the driest years in history, with half the normal rainfall, so grass and water were short. The calves were weighed four times during the year, and when they were sold after a year on the pasture, they had made an average gain of 394 lbs. "That figured out a gain per acre of 97.28 pounds of beef," says Thompson, "and calculated at 15 cents a pound, the gain value of beef per acre was $14.59. That was more than the land and the spraying cost. It gives you some idea what the food-producing possibilities are on the land that we are allowing to stay in brush."

The producers of the basic hormone chemicals used for brush killing are: American Chemical Paint Co.; Diamond Alkali Co.; Dow Chemical Co.; Dupont; Monsanto Chemical Co.; Pittsburgh Coke and Chemical Co.; Thompson Chemicals Corp.; and Thompson Hayward.

Since the 2,4-D and 2,4,5-T hormones came out of the laboratories in 1945, the producers of the basic chemicals have spent much of their time in pushing their products in the big markets; power line right-of-ways, roadside and railroad right-of-ways, and industrial users. Now they are turning their attention to the still bigger U. S. farm brush-killing market where it is estimated there are nearly 250 million brushy acres in 48 states that could be put into useful production.

While much of the work with chemical land-clearing has been done on large tracts in the Southwest, the methods can be used on Midwest farms just as easily. Both the basal bark type of application and ground spraying of the foliage can be done with a small investment in equipment. The basal bark treatment can be done at any time of the year and the foliage spraying can be fitted in between spring and summer jobs. Hot, sticky summer days when the humidity gets around 90 per cent are ideal. To the farmer who has brush trees that are creeping into fields along fence lines, chemical spraying looks like a cheap and effective way to throw the rascals out.

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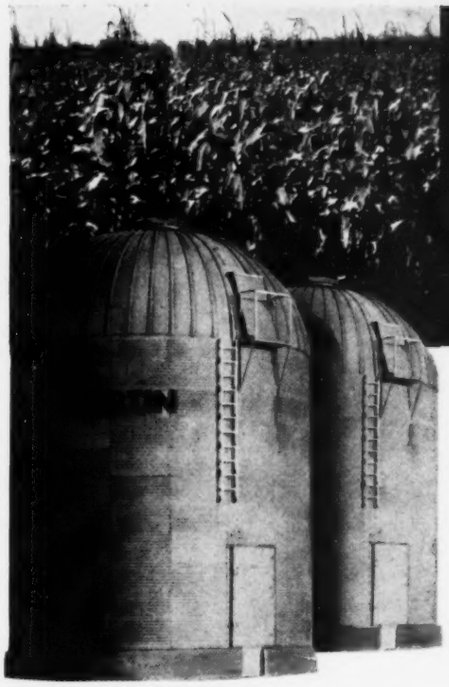

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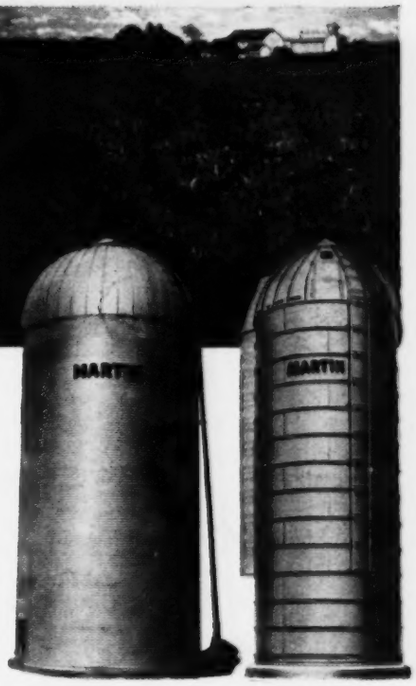

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In its first really competitive test, the Minneapolis-Moline Uni-Farmor swept the field! In the International Mechanical Corn Picking Contest, MM Uni-Huskors placed 1st, 2nd, and 3rd. That's real proof of the prize-winning performance you get with the MM Uni-Farmor.

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And look at the money you save! You save up to $1500 or more on the Uni-Tractor and 3 Uni-Machines over the cost of pull-behind equipment. Every Uni-Machine you buy after that adds to that first big saving.

You owe it to yourself to get the facts about Uni-Farming. Mail the coupon for free literature. Then see your MM Dealer for first-hand information.

UNI-HARVESTOR
Here's famed Harvestor performance with all the advantages of self-propelled operation. Variable-speed drive, Uni-Matic hydraulic header control, highspeed auger unloader—you profit by them all.

UNI-WINDROWER
New Uni-Matic height control, big, 10-foot capacity and perfect cutting visibility make this self-propelled windrower outstanding. You'll use this cost-cutting Uni-Machine all summer long.

UNI-HUSKOR
This MM Uni-Huskor won 1st, 2nd and 3rd prizes in the toughest international competition. Uni-Matic height control, exclusive MM husking bed with rotating and side-to-side action, full length corn saver. Low-cost championship* sheller attachment lets you convert to picking-shelling.
**MM Shellers are by far the leading sellers in sizes from 175 to 1200 bushels per hour.*

UNI-PICKER-SHELLER
With this advanced MM Uni-Picker-Sheller, you pick and shell corn with up to 30% moisture content, in one trip through. You profit by all the prize-winning advantages of the Uni-Huskor, plus the thorough, big-capacity shelling of MM's famed Model D Sheller. Powerful cleaning fan and long cleaning sieves deliver a clean, trash-free crop to the tank.

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

Want the facts? Mail Coupon

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( ) UNI-HUSKOR ( ) UNI-PICKER-SHELLER

Tell us WHAT other Uni-Machines you'd be interested in—in the future?

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